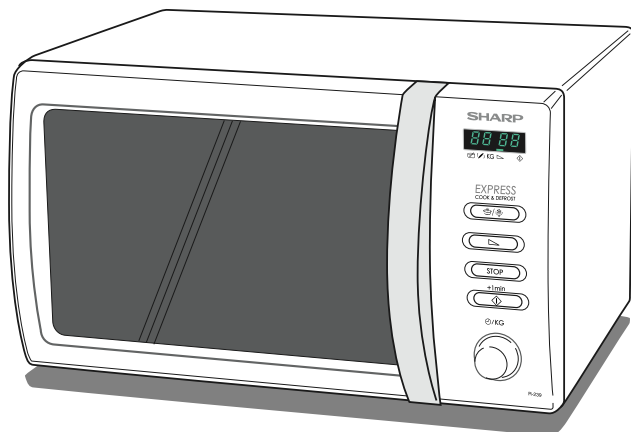


SHARP SERVICE MANUAL

No. S5506R239PHWS



MICROWAVE OVEN

MODELS **R-239(IN)**
R-239(W)

In interests of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.

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Parts Guide

CHAPTER 1. BEFORE SERVICING

[1] GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

WARNING: THIS APPLIANCE MUST BE EARTHED

IMPORTANT

THE WIRES IN THIS MAINS LEAD ARE COLOURED IN ACCORDANCE WITH THE FOLLOWING CODE:

GREEN-AND-YELLOW -----EARTH
 BLUE -----NEUTRAL
 BROWN -----LIVE

[2] WARNING

Note: The parts marked "△" are used at voltage more than 250V. (Parts List)
 Anm: Delar märket med "△" har en spänning överstigande 250V.
 Huom: Huolto-ohjeeseen merkitty "△" osat joissa jännite on yli 250 V.
 Bemerk: Deler som er merket "△" er utsatt for spenninger over 250V til jord.
 Bemærk: Dele mærket med "△" benyttes med højere spænding end 250 volt.

Never operate the oven until the following points are ensured.

- (A) The door is tightly closed.
- (B) The door brackets and hinges are not defective.
- (C) The door packing is not damaged.
- (D) The door is not deformed or warped.
- (E) There is not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service engineers.

Removal of the outer wrap gives access to potentials above 250V.

All the parts marked “*” on parts list may cause undue microwave exposure, by themselves, or when they are damaged, loosened or removed.

[3] CAUTION MICROWAVE RADIATION

Personnel should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured.

Never operate the device without a microwave energy absorbing load attached.

Never look into an open waveguide or antenna while the device is energized.

VARNING MICKROVAGSSTRÅLING

Personal får inte utsättas för mikrovågsenergi som kan stråla från magnetronen eller andre mikrovågsstrålande anordningar om dessa är felanslutna eller används på fel sätt. Alla in-och utgångsanslutningar för mikrovågor, vågledare, flänsar och packningar måste vara fast anslutna.

Mikrovågsgeneratoren får inte arbeta utan att absorberande belastning är ansluten. Titta aldrig in i en öppen vågledare eller antenn när mikrovågsgeneratoren är påkopplad eller laddad.

VAROITUS MIKROAALTOSÄTELYÄ

Käyttäjä ei saa joutua alttiiksi mikroaaltoenergialle, jota voi säteillä magnetronista tai muusta mikroaaltoja kehittävästä laitteesta, jos sitä käytetään tai jos se kytketään väärin. Kaikkien mikroaaltoliitännöiden sekä syöttö-että ulostulopuolella, aaltoputkien laippojen ja tiivisteiden tulee olla varmistettuja.

Mikroaaltouunnia ei koskaan saa käyttää ilman kuormaa jossa mikroaaltoenergiaa kuluu. Avoimeen aaltoputkeen tai antenniin ei koskaan saa katsoa virran ollessa kytkettynä.

ADVARSEL MIKROBØLGESTRÅLING

Personell må ikke utsettes for mikrobølge-energi som kan utståles fra magnetronen eller andre mikrobølge-generende deler dersom apparatet feilbetjenes eller blir feiltilkoplet. Alle inn-og ut-tilkoplinger i forbindelse med mikrobølge-strålingen, bølgeledere, flenser og tetningsringer/pakninger må festes ordentlig.

Aldri bruk apparatet med mindre en mikrobølge-absorberende last er plassert i ovnsrommet.

Aldri se direkte inn i en åpen bølgeleder eller antenne imens apparatet er strømførende

ADVARSEL MIKROBØLGEBESTRÅLING

Man bør ikke udsætte sig for mikrobølgebestråling fra magnetronen eller andre mikrobølgefrembringende anordninger, hvilket kan ske hvis apparatet er forkert tilsluttet eller bruges forkert. Alle mikrobølgeindgange og-udgange, bølgeledere, flanger og tætningsstrimler må være forsvarligt udført.

Anvend aldrig ovnen uden en mikrobølgesabsorberende anordning. Se aldrig ind i en åben bølgeleder eller antenne, mens ovnen er i brug.

CHAPTER 2. WARNING TO SERVICE PERSONNEL

(GB) Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts will result in electrocution.
High voltage capacitor, High voltage transformer, Magnetron, High voltage rectifier assembly, High voltage harness.

REMEMBER TO CHECK 3D

- 1) Disconnect the supply.
- 2) Door opened, and wedged open.
- 3) Discharge high voltage capacitor.

WARNING: AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is, of the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-finding is carried out with the supply disconnected. It may in some cases, be necessary to connect the supply after the outer case has been removed, in this event carry out 3D checks and then disconnect the leads to the primary of the high voltage transformer. Ensure that these leads remain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed carry out 3D checks and reconnect the leads to the primary of the high voltage transformer.

REMEMBER TO CHECK 4R

- 1) Reconnect all leads removed from components during testing.
- 2) Replace the outer case (cabinet).
- 3) Reconnect the supply.
- 4) Run the oven. Check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the power to HIGH and set the microwave timer for two (2) minutes. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out 3D checks and re-examine the connections to the component being tested.

When all service work is completed, and the oven is fully assembled, the microwave power output should be checked and a microwave leakage test should be carried out.

(NL) Magnetronovens bevatten circuits die een zeer hoge spanning en stroom kunnen voortbrengen. Contact met de volgende onderdelen kan elektrocutie tot gevolg hebben.
Hoogspanningscondensator, hoogspanningstransformator, magnetron, hoogspanningsgelijkrichter, hoogspanningskabelboom.

VERGEET DE VOLGENDE 3 STAPPEN NIET

- 1) Haal de stekker uit het stopcontact.
- 2) Open de deur en zorg ervoor dat hij niet dicht kan vallen.
- 3) Ontlaad de hoogspanningscondensator.

PAS OP VOOR DE ELECTRISCHE LADING VAN DE HOOGSPANNINGSCONDENSATOR

De hoogspanningscondensator blijft nog ongeveer 60 seconden lang opgeladen, nadat de oven is uitgeschakeld. Wacht 60 seconden voordat u de verbinding van de hoogspannings-condensator (m.a.w. de verbindingsdraad van de hoogspanningsgelijkrichter) met een geïsoleerde schroevendraaier kortsluit tegen het chassis.

Sharp beveelt ten sterkste aan dat, voor zover mogelijk, defecten worden opgespoord wanneer de stekker uit het stopcontact is gehaald. Soms is het nodig om de stroomtoevoer weer tot stand te brengen nadat de buitenmantel verwijderd is. Herhaal dan de bovengenoemde 3 stappen en haal de elektrische draden uit de primaire zijde van de vermogenstransformator. Zorg ervoor dat deze draden geïsoleerd blijven van andere elementen en van het chassis van de oven. (Gebruik zo nodig isolatieband.) Wanneer de test is uitgevoerd, herhaalt u de bovenstaande 3 stappen en verbindt u de elektrische draden weer aan de primaire zijde van de vermogenstransformator.

VERGEET DE VOLGENDE 4 STAPPEN NIET

- 1) Sluit de draden weer aan die zijn losgehaald voor de test.
- 2) Plaats de buitenmantel weer om het toestel heen (kabinet).
- 3) Stop de stekker weer in het stopcontact.
- 4) Zet de oven aan. Controleer alle functies.

Magnetronovens mogen niet leeg aangezet worden. Om te controleren of er microgolf-energie binnen de oven wordt geproduceerd, plaatst u een mok met koud water op de draaitafel van de oven, sluit de deur, zet de oven op HIGH en stelt de klok van de magnetron in op twee (2) minuten. Wanneer de twee minuten voorbij zijn (klok staat op nul), controleert u voorzichtig of het water heet is. Indien het water nog steeds koud is, herhaalt u de allereerste drie stappen en controleer nogmaals de aansluitingen naar de geteste onderdelen.

Wanneer alle reparaties zijn uitgevoerd en de oven weer in elkaar is gezet, moet de het magnetronvermogen worden gecontroleerd en moet worden gecontroleerd of er geen microgolflekage is.

- (E) Los hornos de microondas contienen circuitos eléctricos capaces de producir voltajes de alta tensión y descargas eléctricas. Para evitar el riesgo de electrocución, absténgase de tocar los siguientes componentes: condensador de alta tensión, transformador de alta tensión, magnetrón, dispositivo del rectificador de alta tensión y armés de alta tensión.

RECUERDE LA COMPROBACION 3D

- 1) Desconecte la alimentación.
- 2) Deje la puerta abierta y calzada.
- 3) Descargue el condensador de alto voltaje.

ADVERTENCIA SOBRE LA CARGA DEL CONDENSADOR DE ALTOVOLTAJE

El condensador de alto voltaje permanece cargado unos 60 segundos después de haber apagado el horno. Espere 60 segundos y luego ponga en cortocircuito la conexión del condensador de alto voltaje (esto es, del conductor de conexión del rectificador de alto voltaje) al chasis con un destornillador de mango aislado.

Se recomienda encarecidamente que siempre que sea posible la localización de fallos se realice con la alimentación desconectada. Puede ser que en algunos casos sea necesario conectar la alimentación después de haber retirado la carcasa exterior. En este caso, realice las comprobaciones 3D y luego desconecte los conductores del primario del transformador de alimentación. Asegúrese de que estos conductores permanezcan aislados de otros componentes y del chasis del horno. (Use cinta aislante si es necesario). Cuando termine la prueba efectúe las comprobaciones 3D y reconecte los conductores al primario del transformador de alimentación.

RECUERDE LA COMPROBACION 4C

- 1) Conecte todos los componentes desconectados de los componentes durante la prueba.
- 2) Coloque la carcasa exterior (cabina).
- 3) Conecte la alimentación.
- 4) Compruebe todas sus funciones después de poner en marcha el horno.

Los hornos de microondas no deben funcionar vacíos. Para comprobar la presencia de energía de microondas dentro de una cavidad, coloque una taza de agua fría en el plato giratorio del horno, cierre la puerta y ponga la potencia en HIGH (alta) y coloque el temporizador en dos (2) minutos. Cuando transcurran los dos minutos (temporizador a cero) compruebe cuidadosamente que el agua se ha calentado. Si el agua permaneciese fría, efectúe las comprobaciones 3D y vuelva a examinar las conexiones de los componentes que han sido probados.

Cuando haya terminado la intervención en el equipo y el horno haya sido ensamblado de nuevo completamente, deberá comprobar la potencia de salida de microondas y realizar una prueba de fugas de microondas.

- (SV) Mikrovågsugnar innehåller kretsar som producerar mycket höga spänningar och strömmar. Kontakt med följande komponenter kan leda till dödsfall: Högspänningskondensator, transformator, magnetron, högspännings likriktare, högspännings kablage.

KOM IHÅG ATT KONTROLLERA 3 STEG

- 1) Koppla från strömkällan.
- 2) Öppna dörren på glänt.
- 3) Ladda ur högspänningskondensatorn.

VARNING FÖR LADDNINGEN I HÖGSPÄNNINGSKONDENSATORN

Högspänningskondensatorn är laddad i 60 sekunder efter det att ugnen stängts av. Vänta 60 sekunder och korislut sedan kondensators anslutning (dvs anslutningen till högspänningslikriktaren) till chassiet med hjälp av en isolerad skruvmejsel.

Sharp rekommenderar att felsökning sker med strömmen fränkopplad. Ibland kan det vara nödvändigt att koppla på strömmen efter det att höljet avlägsnats, utför då 3 Steg kontrollen och koppla sedan från ledarna till transformatorns primärsida. Se till att ledarna är isolerade från andra komponenter och chassiet. (Använd isoleringsband om det behövs). När Du testat färdigt utför Du 3 Steg kontrollen och ansluter ledningarna till transformatorns primärsida igen.

KOM IHÅG ATT KONTROLLERA 4 STEG

- 1) Anslut alla ledningar som använts vid testning
- 2) Sätt tillbaka ytterhöljet.
- 3) Anslut strömkällan på nytt.
- 4) Sätt på ugnen. Kontrollera alla funktioner.

Mikrovågsugnar får inte användas tomma. Kontrollera mikrovågsstrålningen i olika delar av ugnen genom att placera en kopp med kallt vatten på ugnens tallrik, stäng dörren, ställ in HIGH och ställ in 2 minuter på timern. När två minuter har gått (timern visar 0) kontrollerar du om vattnet är varmt. Om vattnet fortfarande är kallt utför Du 3 steg kontroller och kontrollerar anslutningarna till varje enskild komponent på nytt.

När all service är klar och ugnen ihopskruvad skall ugnens uteffekt och eventuellt mikrovågsläckage kontrolleras.



I forni a microonde contengono un circuito elettrico in grado di generare tensioni e correnti estremamente elevate. L'eventuale contatto con i seguenti componenti può causare la folgorazione: condensatore ad alta tensione; trasformatore ad alta tensione; magnetron; rettificatore alta tensione; cablaggio ad alta tensione.

TRE OPERAZIONI IMPORTANTI PER INCOMINCIARE

- 1) Scollegare l'alimentazione elettrica.
- 2) Verificare che la porta sia bloccata in posizione aperta.
- 3) Scaricare il condensatore ad alta tensione.

ATTENZIONE AL CONDENSATORE AD ALTA TENSIONE: PUO ESSERE CARICO

Il condensatore ad alta tensione rimane carico per circa 60 secondi dopo lo spegnimento del forno. Occorre quindi aspettare 60 secondi prima di cortocircuitare, utilizzando un cacciavite con impugnatura isolata, il collegamento del condensatore ad alta tensione (cioè del conduttore di collegamento del raddrizzatore ad alta tensione) sul telaio del forno.

Sharp raccomanda, nei limiti del possibile, che la ricerca dei guasti avvenga in assenza di alimentazione elettrica. In alcuni casi tuttavia, può essere necessario alimentare l'apparecchio dopo aver rimosso la scatola esterna. In questo caso eseguire i tre controlli sopra citati e quindi scollegare i connettori dal primario del trasformatore. Assicurarsi che tali connettori non vengano a contatto con altri componenti, né con il telaio del forno (fare uso, se necessario, di nastro isolante). Al termine dell'intervento, eseguire nuovamente i tre controlli e ricollegare i conduttori al primario del trasformatore.

QUATTRO VERIFICHE IMPORTANTI DA NON DIMENTICARE

- 1) Ricollegare tutti i conduttori staccati dai vari componenti durante l'intervento.
- 2) Rimontare la scatola esterna.
- 3) Ripristinare l'alimentazione elettrica.
- 4) Rimettere in funzione il forno. Controllare tutte le funzioni.

I forni a microonde non devono mai funzionare a vuoto. Per verificare la presenza di energia da microonde all'interno di una cavità, mettere una tazza di acqua fredda sul piatto rotante del forno, chiudere la porta, regolare la potenza su HIGH ed impostare il temporizzatore su due (2) minuti. Trascorsi i due minuti (temporizzatore a zero), controllare accuratamente che ora l'acqua sia calda. Se l'acqua è rimasta fredda, eseguire i tre controlli iniziali e verificare nuovamente i collegamenti del componente in questione.

Dopo aver portato a termine le operazioni di manutenzione e rimontato il forno, è necessario controllare la potenza delle microonde emesse ed eseguire un test per verificare che non vi sia alcuna dispersione.

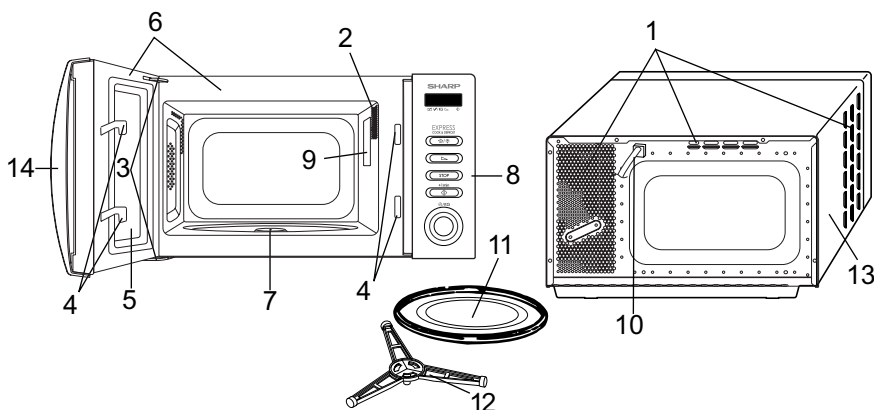
CHAPTER 3. PRODUCT SPECIFICATIONS

TEM	DESCRIPTION
Power Requirements	230 Volts 50 Hertz Single phase, 3 wire earthed
Power Consumption	1.25 kW
Power Output	800 watts nominal of RF microwave energy (IEC60705 Test Procedure) Operating frequency 2450 MHz
Case Dimensions	Width 460 mm Height 275 mm including foot Depth 380 mm
Cooking Cavity Dimensions	Width 319 mm NOTE: Internal capacity is calculated by measuring maximum width, depth and height. Height 211 mm Actual capacity for holding food is less. Depth 336 mm
Turntable diameter	272 mm
Control Complement	Touch Control System Timer (0 - 99 minutes 90 seconds) Clock (1:00 - 12:59) or (0:00 - 23:59) Microwave Power for Variable Cooking Repetition Rate; 100P Full power throughout the cooking time 70Papprox. 70% of FULL Power 50P approx. 50% of FULL Power 30Papprox. 30% of FULL Power 10Papprox. 10% of FULL Power EXPRESS COOK & DEFROST button MICROWAVE POWER LEVEL button STOP button START/+1 min button TIMER/WEIGHT knob
Set Weight (Approx.)	12 kg

CHAPTER 4. APPEARANCE VIEW

[1] OVEN

1. Ventilation openings
2. Oven lamp
3. Door hinges
4. Door safety latches
5. See through door
6. Door seals sealing surfaces
7. Coupling
8. Control panel
9. Waveguide cover
10. Power supply cord
11. Turntable
12. Roller stay
13. Outer case cabinet
14. Door opening handle



[2] TOUCH CONTROL PANEL

1. Digital Display
2. Indicators

The appropriate indicator will flash or light up, just above each symbol according to the instruction. When an indicator is flashing, do the necessary operation.

Stir

Turn over

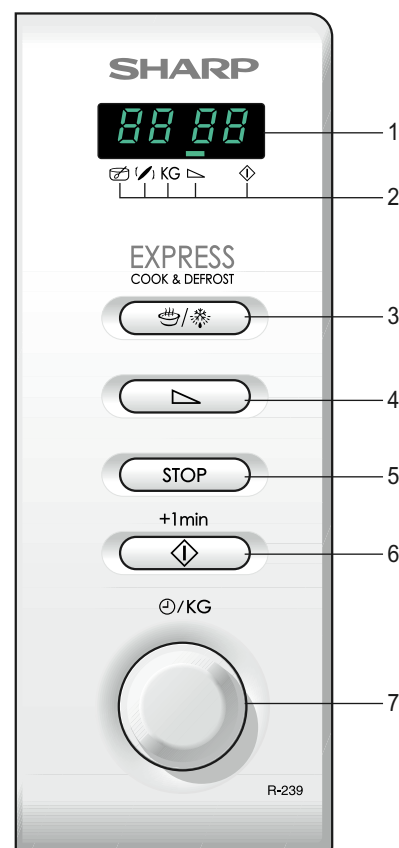
KG Weight

Microwave power level

Cooking in progress

3. EXPRESS COOK & DEFROST button
Press to select one of the 12 automatic programmes.
4. MICROWAVE POWER LEVEL button
5. STOP button
6. START/+1min button
7. TIMER/WEIGHT knob

NOTE: Some one-touch cooking features such as “START/+1 min” are disabled after three minutes when the oven is not in use. These features are automatically enabled when the door is opened and closed or the STOP button is pressed.



CHAPTER 5. OPERATION SEQUENCE

[1] OFF CONDITION

Closing the door activates all door interlock switches (1st. latch switch, 2nd. interlock relay control switch).

IMPORTANT

When the oven door is closed, the monitor switch contacts (COM-NC) must be open.

When the microwave oven is plugged in a wall outlet, rated voltage is supplied to the noise filter and the control unit.

Figure O-1 on page 14-1

1. The display will show flashing "88:88".
2. To set any programmes or set the clock, you must first touch the STOP button.
3. " : " appears in the display.

[2] MICROWAVE COOKING CONDITION

1. HIGH COOKING

Enter a desired cooking time by rotating the TIMER/WEIGHT knob and start the oven with pressing START/+1 min button.

Function sequence

Figure O-2 on page 14-1

CONNECTED COMPONENTS	RELAY
Oven lamp, Fan motor, Turntable motor	RY1
high voltage transformer T	RY2

1. Rated voltage is supplied to the primary winding of the high voltage transformer I. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
2. The filament winding voltage (3.3 volts) heats the magnetron filament and the high voltage (2000 volts) is sent to the voltage doubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
3. The 2450 MHz microwave energy produced in the magnetron MG generates a wave length of 12.24 cm. This energy is channelled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
4. When the cooking time is up, a signal tone is heard and the relays (RY1+RY2) go back to their home position. The circuits to the oven lamp OL, high voltage transformer I, fan motor FM and turntable motor TTM are cut off.
5. When the door is opened during a cook cycle, the switches come to the following condition

SWITCH	CONTACT	CONDITION	
		DURING COOKING	DOOR OPEN (NO COOKING)
1st. latch switch	COM-NO	Closed	Open
2nd. interlock relay control switch	COM-NO	Closed	Open
monitor switch	COM-NC	Open	Closed

The circuits to the high voltage transformer I, fan motor FM, turntable motor TTM and oven lamp OL are cut off when the 1st. latch switch SW1 and 2nd. interlock relay control switch SW3 are made open.

6. MONITOR SWITCH CIRCUIT

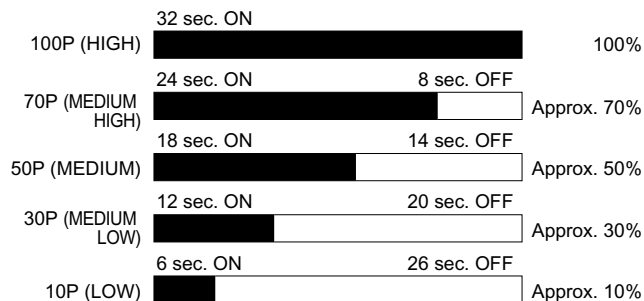
The monitor switch SW2 is mechanically controlled by oven door, and monitors the operation of the 1st. latch switch SW1, the relay RY1 and the 2nd. interlock relay RY2.

- 1) When the oven door is opened during or after the cycle of a cooking program, the 1st. latch switch SW1 and 2nd. interlock relay control switch SW3 must open their contacts first. After that the contacts (COM-NC) of the monitor switch SW2 can be closed.
- 2) When the oven door is closed, the contacts (COM-NC) of the monitor switch SW2 must be opened. After that the contacts of the 1st. latch switch SW1 and 2nd. interlock relay control switch SW3 are closed.
- 3) When the oven door is opened and the contacts of the 1st. latch switch SW1, the relay RY1 and the 2nd. interlock relay RY2 remain closed. The fuse F1 T6.3A will blow, because the monitor switch SW2 is closed and a short circuit is caused.

2. MEDIUM HIGH, MEDIUM, MEDIUM LOW, LOW COOKING

When the microwave oven is preset for variable cooking power, rated voltage is supplied to the high voltage transformer I intermittently within a 32-second time base through the relay contact which is coupled with the current-limiting relay RY2. The following levels of microwave power are given.

SETTING;



NOTE: The ON/OFF time ratio does not exactly correspond to the percentage of microwave power, because approx. 3 seconds are needed for heating up the magnetron filament.

[3] POWER OUTPUT REDUCTION

After 100% power cooking mode is carried out for more than 20 minutes, the power out-put is automatically reduced to 70%. Even if the cooking time is shorter than for 20 minutes, the power output is reduced to 70% after total cooking time over 20 minutes when the oven is started in 100% power cooking mode again within 1 minute and 35 seconds.

CHAPTER 6. FUNCTION OF IMPORTANT COMPONENTS

[1] DOOR OPEN MECHANISM

The door is opened by pulling the door, refer to the Figure D-1.

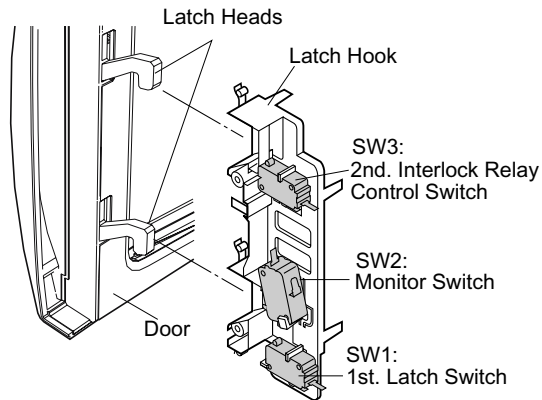


Figure D-1. Door Open Mechanism

[2] 1ST. LATCH SWITCH (SW1) AND 2ND. INTERLOCK RELAY CONTROL SWITCH (SW3)

1. When the oven door is closed, the contacts (COM-NO) must be closed.
2. When the oven door is opened, the contacts (COM-NO) must be opened.

[3] MONITOR SWITCH (SW2)

1. When the oven door is closed, the contacts (COM-NC) must be opened.
2. When the oven door is opened, the contacts (COM-NC) must be closed.
3. If the oven door is opened and the contacts (COM-NO) of the 1st latch switch SW1, the relay RY1 and the 2nd. interlock relay RY2 fail to open, the fuse F1 T6.3A blows simultaneously with closing the contacts (COM-NC) of the monitor switch.

CAUTION: BEFORE REPLACING A FUSE F1 T6.3A TEST THE 1ST. LATCH SWITCH SW1, RELAY (RY1) AND 2ND. INTERLOCK RELAY RY2 AND MONITOR SWITCH SW2 FOR PROPER OPERATION. (REFER TO CHAPTER "TEST PROCEDURE".)

[4] FUSE (F1) T6.3A

1. The fuse F1 T6.3A blows when the contacts (COM-NO) of the 1 st. latch switch SW1, the relay RY1 and the 2nd. interlock relay RY2 remain closed with the oven door open and when the monitor switch SW2 closes.
2. If the wire harness or electrical components are short-circuited, the fuse F1 T6.3A blows to prevent an electric shock or fire hazard.

[5] HIGH VOLTAGE FUSE (F2)

The high voltage fuse F2 blows when the high voltage rectifier or the magnetron is shorted.

[6] TEMPERATURE FUSE (TF) 150C (OVEN)

The temperature fuse TF located on the top of the oven cavity is designed to prevent damage to the oven if the foods in the oven catch fire due to over heating produced by improper setting of cook time or failure of control unit. Under normal operation, the temperature fuse TF remains closed. However, when abnormally high temperatures are reached within the oven cavity, the temperature fuse TF will open at 150°C, causing the oven to shut down. The defective temperature fuse TF must be replaced with a new one.

[7] TURNTABLE MOTOR (TTM)

The turntable motor TTM drives the turntable roller assembly to rotate the turntable.

[8] FAN MOTOR (FM)

The fan motor FM drives a blade which draws external cool air. This cool air is directed through the air vanes surrounding the magnetron MG and cools the magnetron MG. This air is channelled through the oven cavity to remove steam and vapours given off from the heating foods. It is then exhausted through the exhausting air vents at the oven cavity.

[9] NOISE FILTER

The noise filter prevents the radio frequency interference that might flow back in the power circuit.

CHAPTER 7. TROUBLESHOOTING GUIDE

[1] FOREWORD

When troubleshooting the microwave oven, it is helpful to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the "Test Procedure" section.

IMPORTANT:

If the oven becomes inoperative because of a blown fuse F1 T6.3A in the 1st. latch switch SW1 - relay RY1 - 2nd. interlock relay RY2 - monitor switch SW2 circuit, check the 1st. latch switch SW1, relay RY1, 2nd. interlock relay RY2 and monitor switch SW2 before replacing the fuse F1 T6.3A.

[2] CHART

TEST PROCEDURE		A	B	C	CK	D	E	E	E	F	G	G	H	K	M	M	N	RE	CK	CK	RE	CK	CK	CK	CK	CK	I	L	J
CONDITION	PROBLEM	MAGNETRON (MG)	HIGH VOLTAGE TRANSFORMER (T)	H.V. RECTIFIER ASSEMBLY	HIGH VOLTAGE WIRE	HIGH VOLTAGE CAPACITOR (C)	1ST. LATCH SWITCH (SW1)	2ND. INTERLOCK RELAY CONTROL SWITCH (SW3)	MONITOR SWITCH SW2	TEMPERATURE FUSE (TF) 150°C (OVEN)	FAN MOTOR (FM)	TURNABLE MOTOR (TTM)	FUSE (F1) T6.3A	TOUCH CONTROL PANEL	RELAY (RY-1)	RELAY (RY-2)	FOIL PATTERN ON P.W.B.	POWER SUPPLY CORD	SHORTED WIRE HARNESS	OPENED WIRE HARNESS	OVEN LAMP (OL)	WALL OUTLET	MISADJUSTMENT SWITCH	HOME FUSE OR BREAKER	BLOCKED COOLING FAN	BLOCKED VENTILATION	NOISE FILTER	SWITCH UNIT	H.V. FUSE (F2)
OFF CONDITION	Home fuse blows when power supply cord is plugged into wall outlet.																	○	○					○					
	FUSE (F) T6.3A blows when power supply cord is plugged into wall outlet.								○				○		○	○			○				○				○		
	"88:88" does not appear in display but power supply cord is plugged into wall outlet.									○			○	○			○	○		○		○		○			○		
	Display does not operate properly when STOP button is pressed.							○						○						○			○					○	
ON CONDITION	Oven does not start when the START button is touched. (Display appears)						○	○						○	○	○				○			○					○	
	Oven lamp does not light (Display appears.)													○	○					○	○								
	Fan motor does not operate. (Display appears.)										○				○					○					○				
	Turntable motor does not operate. (Display appears.)											○			○					○									
	Oven or any electrical parts does not stop when cooking time is 0 or STOP button is pressed.													○	○	○													
	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power level is set at 100%)	○	○	○	○	○	○							○		○				○			○						○
	Oven does not seem to be operating properly when 70%, 50%, 30% or 10% is set. (Oven operates properly at 100%.)													○		○													
	Oven goes into cook cycle but shuts down before end of cooking cycle.									○				○											○	○			

CHAPTER 8. TEST PROCEDURES

[1] Procedure A : MAGNETRON (MG) TEST

NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.

CARRY OUT 3D CHECKS.

Isolate the magnetron from the high voltage circuit by removing all leads connected to the filament terminal.

To test for an open circuit filament use an ohmmeter to make a continuity test between the magnetron filament terminals, the meter should show a reading of less than 1 ohm.

To test for a short circuit filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an infinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced.

MICROWAVE OUTPUT POWER (1 litre water load)

The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer case fitted). Microwave output power from the magnetron can be measured by IEC test procedure, i.e. it can be measured by using water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used. When P(W) heating works for t(sec-ond), approximately $P \times t / 4.187$ calorie is generated. On the other hand, if the temperature of the water with V(ml) rises ΔT ($^{\circ}\text{C}$) during this microwave heating period, the calorie of the water is $v \times \Delta T$.

The formula is as follows;	
$P \times t / 4.187 = V \times \Delta T + 0.55 \times mc (T_2 - T_0) / 4.187$	$P (W) = 4.187 \times V \times \Delta T / t + 0.55 \times mc (T_2 - T_0) / t$
Our condition for water load is as follows:	
Room temperature (T0) around 20 $^{\circ}\text{C}$	Power supply Voltage Rated voltage
Water load 1000 g	Initial temperature (T1) 10 \pm 1 $^{\circ}\text{C}$
Heating time 52 sec.	Mass of container (mc) 330 g
T2 Final Temperature	$\Delta T = T_2 - T_1$ $P = 80 \times \Delta T + 0.55 \times mc (T_2 - T_0) / 52$

Measuring condition:

1) Container

The water container must be a cylindrical borosilicate glass vessel having a maximum material thickness of 3 mm and an outside diameter of approximately 190 mm.

2) Temperature of the oven and vessel

The oven and the empty vessel are at ambient temperature prior to the start of the test.

3) Temperature of the water

The initial temperature of the water is (10 \pm 1) $^{\circ}\text{C}$

4) Select the initial and final water temperature so that the maximum difference between the final water temperature and the ambient temperature is 5 $^{\circ}\text{C}$.

5) Select stirring devices and measuring instruments in order to minimize addition or removal of heat.

6) The graduation of the thermometer must be scaled by 0.1 $^{\circ}\text{C}$ at minimum and an accurate thermometer.

7) The water load must be (1000 \pm 5) g.

8) "t" is measured while the microwave generator is operating at full power. Magnetron filament heat-up time is not included.

NOTE: The operation time of the microwave oven is "t + 3" sec. 3 sec. is magnetron filament heat-up time.

Measuring method:

1) 1.Measure the initial temperature of the water before the water is added to the vessel.

(Example: The initial temperature T1 = 11 $^{\circ}\text{C}$)

2) Add the 1 litre water to the vessel.

3) Place the load on the centre of the shelf.

4) Operate the microwave oven at 100% for the temperature of the water rises by a value ΔT of 10 $^{\circ}\text{C}$.

5) Stir the water to equalize temperature throughout the vessel.

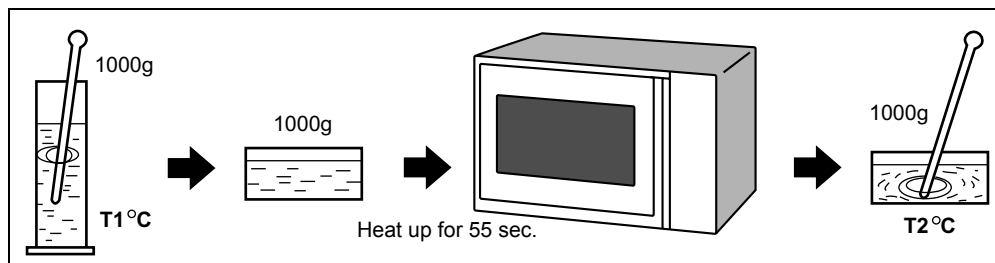
6) Measure the final water temperature. (Example: The final temperature T2 = 21 $^{\circ}\text{C}$)

7) Calculate the microwave power output P in watts from above formula.

Room temperature	To = 21 $^{\circ}\text{C}$
Initial temperature	T1 = 11 $^{\circ}\text{C}$
Temperature after (52 + 3) = 55 sec	T2 = 21 $^{\circ}\text{C}$
Temperature difference Cold-Warm ($\Delta T = T_2 - T_1$)	$\Delta T = 10^{\circ}\text{C}$
Measured output power	
The equation is " $P = 80 \times \Delta T$ "	$P = 80 \times 10^{\circ}\text{C} = 800 \text{ Watts}$

JUDGEMENT: The measured output power should be at least $\pm 15\%$ of the rated output power.

CAUTION: 1 $^{\circ}\text{C}$ CORRESPONDS TO 80 WATTS. REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



[2] Procedure B: HIGH VOLTAGE TRANSFORMER (T) TEST

WARNING: High voltages and large currents are present at the secondary winding and filament winding of the power transformer. It is very dangerous to work near this part when the oven is on. NEVER make any voltage measurements of the high-voltage circuits, including the magnetron filament.

1. CARRY OUT 3D CHECKS.
2. Disconnect the leads to the primary winding of the high voltage transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three winding. The following readings should be obtained:
 - a. Primary winding ----- 2.7 ohms approximately
 - b. Secondary winding ----- 208 ohms approximately
 - c. Filament winding ----- less than 1 ohm

If the readings obtained are not stated as above, then the high voltage transformer is probably faulty and should be replaced.

3. Also, the high voltage transformer has the thermal cut-out in the primary coil. The thermal cut-out will open when the temperature of the thermal cut-out in the primary coil reaches approximately 150°C . The thermal cut-out resets automatically at 130°C . If an ohmmeter indicates an open circuit under normal condition, replace the high voltage transformer because the primary coil (thermal cut-out) has opened. An open primary coil (thermal cut-out) indicates overheating of the high voltage transformer. Check for restricted air flow to the high voltage transformer, especially the ventilation opening.
4. CARRY OUT 4R CHECKS.

[3] Procedure C: HIGH VOLTAGE RECTIFIER TEST

CARRY OUT 3D CHECKS.

Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is infinite in one direction and more than 100 k Ω in the other direction.

CARRY OUT 4R CHECKS.

NOTE: FOR MEASUREMENT OF THE RESISTANCE OF THE RECTIFIER, THE BATTERIES OF THE MEASURING INSTRUMENT MUST HAVE A VOLTAGE AT LEAST 6 VOLTS, BECAUSE OTHERWISE AN INFINITE RESISTANCE MIGHT BE SHOWN IN BOTH DIRECTION.

[4] Procedure D: HIGH VOLTAGE CAPACITOR (C) TEST

CARRY OUT 3D CHECKS.

1. Isolate the high voltage capacitor from the circuit.
2. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
3. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10M Ω after it has been charged.
4. A short-circuited capacitor shows continuity all the time.
5. An open capacitor constantly shows a resistance about 10 M Ω because of its internal 10M Ω resistance.
6. When the internal wire is opened in the high voltage capacitor shows an infinite resistance.
7. The resistance across all the terminals and the chassis must be infinite when the capacitor is normal.

If incorrect reading are obtained, the high voltage capacitor must be replaced.

CARRY OUT 4R CHECKS.

[5] Procedure E: SWITCH (SW, SW2, SW3) TEST

CARRY OUT 3D CHECKS.

Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

Table: Terminal Connection of Switch			
Plunger Operation	COM to NO	COM to NC	COM; Common terminal
Released	Open circuit	Short circuit	NO; Normally open terminal
Depressed	Short circuit	Open circuit.	NC; Normally close terminal

If incorrect readings are obtained, make the necessary switch adjustment or replace the switch.

CARRY OUT 4R CHECKS.

[6] Procedure F: TEMPERATURE FUSE (TF) TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the terminals of the temperature fuse. Then using an ohmmeter, make a continuity test across the two terminals as described in the below.

Table: Temperature Fuse Test			
Parts Name	Temperature of "ON" condition (closed circuit).	Temperature of "OFF" condition (open circuit).	Indication of ohmmeter (When room temperature is approx. 20°C.)
Temperature fuse 150°C	This is not resetable type.	Above 150°C	Closed circuit

If incorrect readings are obtained, replace the temperature fuse.

An open circuit temperature fuse (OVEN) indicates that the food in the oven cavity may catch fire, this may be due to overheating produced by improper setting of the cooking time or failure of the control panel.

CARRY OUT 4R CHECKS.

[7] Procedure G: MOTOR WINDING TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the motor. Using an ohmmeter, check the resistance between the two terminals as described in the table below.

Table: Resistance of Motor	
Motors	Resistance
Fan motor <u>FM</u>	Approximately 250 Ω
Turntable motor <u>TTM</u>	Approximately 14.7 k Ω

If incorrect readings are obtained, replace the motor.

CARRY OUT 4R CHECKS.

[8] Procedure H: FUSE (F1) T6.3A

CARRY OUT 3D CHECKS.

If the fuse F1 T6.3A is blown when the door is opened, check the 1st. latch switch SW1, relay RY1, 2nd. interlock relay RY2 and monitor switch SW2.

If the fuse F1 T6.3A is blown by incorrect door switching replace the defective switch(es) and the fuse F1 T6.3A.

If the fuse F1 T6.3A is blown, there is a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS.

CAUTION: ONLY REPLACE FUSE F1 T6.3A WITH THE CORRECT VALUE REPLACEMENT.

[9] Procedure I: NOISE FILTER TEST

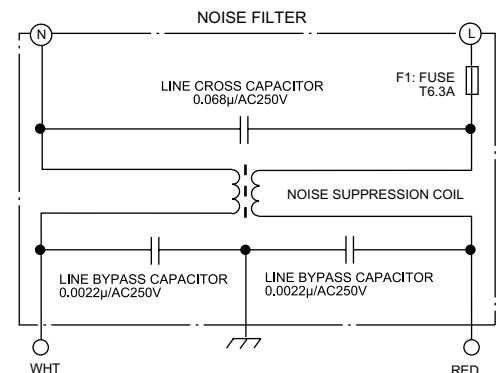
CARRY OUT 3D CHECKS.

Disconnect the leads from the terminals of the noise filter. Using an ohmmeter, check between the terminals as described in the following table.

MEASURING POINT	INDICATION OF OHMMETER
Between N and L	Open circuit
Between terminal N and WHITE	Short circuit
Between terminal L and RED	Short circuit

If incorrect readings are obtained, replace the noise filter unit.

CARRY OUT 4R CHECKS.



[10] Procedure J: HIGH VOLTAGE FUSE (F2) TEST

CARRY OUT 3D CHECKS.

If the high voltage fuse F2 is blown, there could be a short in the high voltage rectifier or the magnetron MG.

Check them and replace the defective parts and the high voltage fuse F2.

CARRY OUT 4R CHECKS.

CAUTION: ONLY REPLACE HIGH VOLTAGE FUSE F2 WITH THE CORRECT VALUE REPLACEMENT.

[11] Procedure K: TOUCH CONTROL PANEL ASSEMBLY TEST

The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance cannot be performed with only a voltmeter and ohmmeter. In this service manual, the touch control panel assembly is divided into two units, Control Unit and Switch Unit, and also the Control Unit is divided into two units, CPU Unit and Power Unit, and troubleshooting by unit replacement is described according to the symptoms indicated.

1. Switch Unit. Note: Check switch unit wire harness connection before replacement.

The following symptoms indicate a defective switch unit. Replace the switch unit.

- 1) When touching the buttons, a certain button produces no signal at all.
- 2) When touching the buttons, sometimes a button produces no signal.
- 3) When rotating the TIMER/WEIGHT knob, the cooking time or the weight can not be input.

2. Control Unit.

The following symptoms indicate a defective control unit. Before replacing the switch unit, perform the Switch unit test (Procedure L) to determine if control unit is faulty.

- 1) In connection with buttons.
 - a) When touching the buttons, a certain group of buttons do not produce a signal.
 - b) When touching the buttons, no buttons produce a signal.
- 2) In connection with indicators.
 - a) At a certain digit, all or some segments do not light up.
 - b) At a certain digit, brightness is low.
 - c) Only one indicator does not light up.
 - d) The corresponding segments of all digits do not light up; or they continue to light up.
 - e) Wrong figure appears.
 - f) A certain group of indicators do not light up.
 - g) The figure of all digits flicker.
- 3) Other possible troubles caused by defective control unit.
 - a) Buzzer does not sound or continues to sound.
 - b) Clock does not operate properly.
 - c) Cooking is not possible.

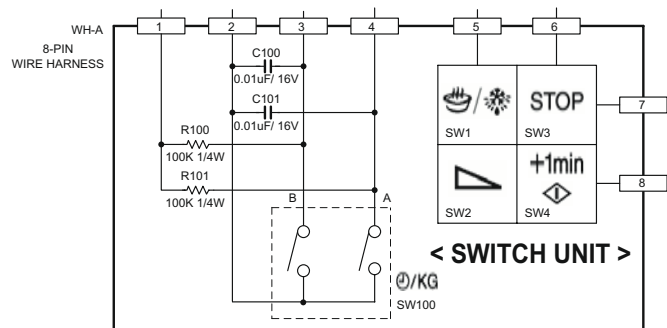
[12] Procedure L: SWITCH UNIT TEST

1. CARRY OUT 3D CHECKS.

2. Isolate the switch unit with the control panel frame to be tested.

3. Using an ohmmeter and referring to the switch unit matrix indicated on the switch unit circuit, check the circuit between the pins of the switch unit that correspond to the STOP button. When the button is pressed, the ohmmeter should indicate short circuit. When the button is released, the ohmmeter should indicate open circuit. If incorrect readings are obtained, the switch unit button is faulty and must be replaced. About the other buttons, the above method may be used.

4. CARRY OUT 4R CHECKS.



[13] Procedure M: RELAY (RY1, RY2) TEST

CARRY OUT 3D CHECKS.

Remove the outer case and check voltage between the normal open terminal of the relay RY1 and the normal open terminal of the relay RY2 on the control unit with an A.C. voltmeter. The meter should indicate 230 volts, if not check oven circuit.

RY1 and RY2 Relay Test

These relays are operated by D.C. voltage

Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking operation.

DC. voltage indicated Defective relay.

DC. voltage not indicated Check diode which is connected to the relay coil. If diode is good, control unit is defective.

RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS
RY1	Approx. 12.6V D.C.	Oven lamp / Turntable motor / Cooling fan motor
RY2	Approx. 12.1V D.C.	High voltage transformer

CARRY OUT 4R CHECKS.

[14] Procedure N: PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN

To protect the electronic circuits, this model is provided with a fine foil pattern added to the primary on the PWB, this foil pattern acts as a fuse. If the foil pattern is open, follow the troubleshooting guide given below for repair.

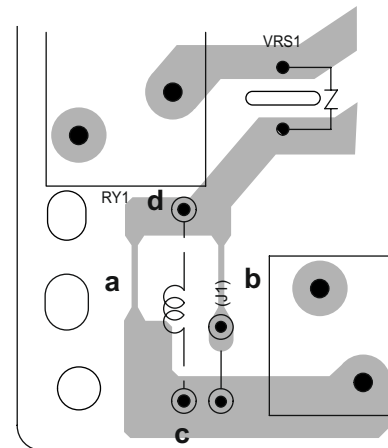
Problem: POWER ON, indicator does not light up.

CARRY OUT 3D CHECKS.

STEPS	OCCURRENCE	CAUSE OR CORRECTION
1	The rated AC voltage is not present between the normal open terminal of the relay RY1 and the normal open terminal of the relay RY2.	Check supply voltage and oven power cord.
2	The rated AC voltage is present to primary side of low voltage transformer.	Low voltage transformer or secondary circuit defective. Check and repair.
3	Only pattern at "a" is broken.	*Insert jumper wire J1 and solder.
4	Pattern at "a" and "b" are broken.	*Insert the coil RCILF2003YAZZ between "c" and "d".

NOTE: *At the time of making these repairs, make a visual inspection of the varistor.
Check for burned damage and examine the transformer with a tester for the presence of layer short-circuit (check the primary coil resistance). If any abnormal condition is detected, replace the defective parts.

CARRY OUT 4R CHECKS.



CHAPTER 9. TOUCH CONTROL PANEL ASSEMBLY

[1] OUTLINE OF TOUCH CONTROL PANEL

The touch control section consists of the following units as shown in the touch control panel circuit.

- (1) Switch Unit (2) Control Unit

The principal functions of these units and their related signals are explained below.

1. Switch Unit

The switch unit is composed of a matrix, signals generated in the LSI are sent to the switch unit through P25 and P33. When a button is pressed, a signal is completed through the switch unit and passed back to the LSI through P50 and P52 to perform the function that was requested. When the jog dial is rotated, the encoder converts the signal from the power source circuit into the pulse signal, and the pulse signal is sent to the LSI through P31 and P32.

2. Control Unit

Control unit consists of LSI, reset circuit, indicator circuit, power source circuit, relay circuit, buzzer circuit and synchronizing signal circuit.

1) Reset Circuit

This circuit generates a signal which resets the LSI to the initial state when power is supplied.

2) Indicator Circuit

This circuit consists of 4-digits, 12-segments and 3-common electrodes using a Liquid Crystal Display.

3) Power Source Circuit

This circuit generates voltage necessary in the control unit from the AC line voltage. In addition, the synchronizing signal is available in order to compose a basic standard time in the clock circuit.

Symbol	Voltage	Application
VSS	-5V	LSI(IC1)

4) Relay Circuit

To drive the magnetron, fan motor, turntable motor and light the oven lamp.

5) Buzzer Circuit

The buzzer is responsive to signals from the LSI to emit audible sounds (switch unit touch sound and completion sound).

6) Synchronizing Signal Circuit

The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit. It accompanies a very small error because it works on commercial frequency.

7) 2nd. Interlock Relay Control Switch

A switch to "tell" the LSI if the door is open or closed.

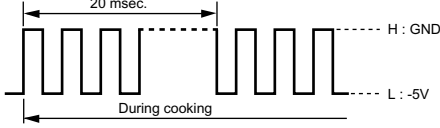
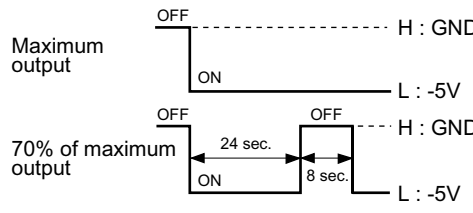
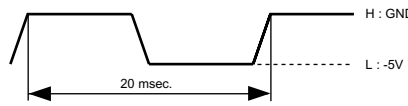
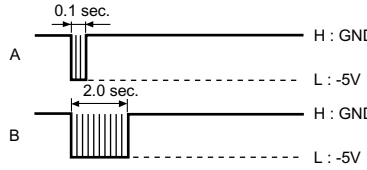
8) Back Light Circuit

A circuit to drive the back light (Light emitting diodes LD1 - LD4).

[2] DESCRIPTION OF LSI

The I/O signal of the LSI are detailed in the following table.

Pin No.	Signal	I/O	Description
1	P50	IN	Signal coming from switch unit. When either H6 line on switch unit matrix is touched, a corresponding signal out of P25 and P33 will be input into P50. When no button is pressed, the signal is held at "H" level.
2	P51	IN	Connected to GND.
3	P52	IN	Signal similar to P50. When either H5 line on switch unit matrix is touched, a corresponding signal will be input into P52.
4	P53	IN	Connected to GND.
5	IC	IN	Connected to VSS.
6	XT1	IN	Connected to VSS.
7	XT2		Terminal not used.
8	VDD	IN	Power source voltage input terminal. The power source voltage to drive the LSI. Connected to GND.
9	VSS	IN	Power source voltage input terminal. The power source voltage to drive the LSI.
10	X1	IN	Internal clock oscillation frequency input setting. The internal clock frequency is set by inserting the resistor-capacitor oscillation circuit with respect to X2 terminal.
11	X2	OUT	Internal clock oscillation frequency control output. Output to control oscillation input of X1.
12	RESET	IN	Auto clear terminal. Signal is input to reset the LSI to the initial state when power is applied.
13-15	P00-P02	OUT	Terminal not used.
16	P03	OUT	Back light circuit (Light emitting diodes) driving signal.
17	CAPH	-	Terminal not used.
18	CAPL	-	Terminal not used.
19-21	VLC0-VLC2	IN	Power source voltage input terminal. Standard voltage for LCD.
22	COM0	OUT	Common data signal. Connected to LCD signal C1.
23	COM1	OUT	Common data signal. Connected to LCD signal C2.
24	COM2	OUT	Common data signal. Connected to LCD signal C3.

Pin No.	Signal	I/O	Description
25	COM3	OUT	Terminal not used.
26-37	SEG0-SEG11	OUT	Segment data signal. Connected to LCD. The relation between signals are as follows: LSI signal (Pin No.) LCD (segment) LSI signal (Pin No.) LCD (segment) SEG 0 (26) ----- S 1 SEG 6 (32) ----- S 7 SEG 1 (27) ----- S 2 SEG 7 (33) ----- S 8 SEG 2 (28) ----- S 3 SEG 8 (34) ----- S 9 SEG 3 (29) ----- S 4 SEG 9 (35) ----- S10 SEG 4 (30) ----- S 5 SEG 10 (36) ----- S11 SEG 5 (31) ----- S 6 SEG 11 (37) ----- S12
38-40	SEG12-SEG14	OUT	Terminal not used.
41	P70	OUT	Oven lamp, fan motor and turntable motor driving signal To turn on and off shut off relay (RY1). The square wave-form voltage is delivered to the RY1 driving circuit and RY2 control circuit. 
42	P71	OUT	Terminal not used.
43	P72	OUT	Magnetron high-voltage circuit driving signal. To turn on and off the cook relay (RY2). The signals holds "L" level during microwave cooking and "H" level while not cooking. In other cooking modes (variable cooking) the signal turns to "H" level and "L" level in repetition according to the power level. 
44	AVDD	IN	A/D converter power source voltage. The power source voltage to drive the A/D converter in the LSI. Connected to GND.
45-48	AIN5-AIN2	IN	Terminal to change cooking input according to the Model. By using the A/D converter contained in the LSI, DC voltage in accordance with the Model in operation is applied to set up its cooking constant.
49-50	AIN1-AIN0	IN	This is the terminal to detect the voltage of the signal coming from the touch key.
51	AVSS	IN	A/D converter power source voltage. The power source voltage to drive the A/D converter in the LSI.
52	P11	IN	To input signal which communicates the door open/close information to LSI. Door close "H" level signal (0V). Door open "L" level signal (-5V)
53	P10	OUT	Terminal not used.
54	P33	OUT	Switch unit strobe signal. Signal applied to switch unit section. A pulse signal is input to P50 and P52 terminal while one of H8 line button on switch unit matrix is touched.
55	P32	IN	Signal coming from encoder (SW100). When the encoder is turned, the contacts of encoder make pulse signals. And pulse signals are input into P32.
56	P31	IN	Signal coming from encoder. Signal similar to P32. Pulse signals are input into P31.
57	INTP0	IN	Signal synchronized with commercial power source frequency. This is the basic timing for time processing of LSI. 
58	P26	OUT	Terminal not used.
59	P25	OUT	Switch unit strobe signal. Signal applied to switch unit section. A pulse signal is input to P50 and P52 terminal while one of H7 line button on switch unit matrix is touched.
60	P24	OUT	Terminal not used.
61	P23	OUT	Terminal not used.
62	P22	OUT	Terminal not used.
63	BZO90	OUT	Signal to sound buzzer (2.0 kHz). A: key touch sound. B: Completion sound. 
64	P20	OUT	Terminal not used.

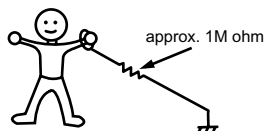
[3] SERVICING FOR TOUCH CONTROL PANEL

1. Precautions for Handling Electronic Components

This unit uses CMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed. CMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charge in clothes, etc., and sometimes it is not fully protected by the built-in protection circuit.

In order to protect CMOS LSI.

- 1) When storing and transporting, thoroughly wrap them in aluminium foil. Also wrap PW boards containing them in aluminium foil.
- 2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Servicing of Touch Control Panel

We describe the procedures to permit servicing of the touch control panel of the microwave oven and the precautions you must take when doing so. To perform the servicing, power to the touch control panel is available either from the power line of the oven itself or from an external power source.

1. Servicing the touch control panel with power supply of the oven:

CAUTION: THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL LIVE DURING SERVICING AND PRESENTS A HAZARD.

Therefore, before checking the performance of the touch control panel,

- 1) Disconnect the power supply cord and then remove outer case.
- 2) Open the door and block it open.
- 3) Discharge high voltage capacitor.
- 4) Disconnect the leads to the primary of the power transformer.
- 5) Ensure that these leads remain isolated from other components and oven chassis by using insulation tape.
- 6) After that procedure, re-connect the power supply cord.

After checking the performance of the touch control panel,

- 1) Disconnect the power supply cord.
- 2) Open the door and block it open.
- 3) Re-connect the leads to the primary of the power transformer.
- 4) Re-install the outer case (cabinet).
- 5) Re-connect the power supply cord after the outer case is installed.
- 6) Run the oven and check all functions.

- a) On some models, the power supply cord between the touch control panel and the oven itself is so short that the two can't be separated. For those models, check and repair all the controls (sensor-related ones included) of the touch control panel while keeping it connected to the oven.

- b) On some models, the power supply cord between the touch control panel and the oven proper is so long enough that they may be separated from each other. For those models, therefore, it is possible to check and repair the controls of the touch control panel while keeping it apart from the oven proper; in this case you must short both ends of the door sensing switch (on PWB) of the touch control panel with a jumper, which brings about an operational state that is equivalent to the oven door being closed. As for the sensor-related controls of the touch control panel, checking them is possible if the dummy resistor(s) with resistance equal to that of the controls are used.

2. Servicing the touch control panel with power supply from an external power source:

Disconnect the touch control panel completely from the oven proper, and short both ends of the door sensing switch (on PWB) of the touch control panel, which brings about an operational state that is equivalent to the oven door being closed. Connect an external power source to the power input terminal of the touch control panel, then it is possible to check and repair the controls of the touch control panel; it is also possible to check the sensor-related controls of the touch control panel by using the dummy resistor(s).

3. Servicing Tools

Tools required to service the touch control panel assembly.

- 1) Soldering iron: 60W
(It is recommended to use a soldering iron with a grounding terminal.)
- 2) Oscilloscope: Single beam, frequency range: DC - 10MHz type or more advanced model.
- 3) Others: Hand tools

4. Other Precautions

- 1) Before turning on the power source of the control unit, remove the aluminium foil applied for preventing static electricity.
- 2) Connect the connector of the key unit to the control unit being sure that the lead wires are not twisted.
- 3) After aluminium foil is removed, be careful that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
- 4) Attach connectors, electrolytic capacitors, etc. to PWB, making sure that all connections are tight.
- 5) Be sure to use specified components where high precision is required.

CHAPTER 10. PRECAUTIONS FOR USING LEAD-FREE SOLDER

1. Employing lead-free solder

The "Main PWB" of this model employs lead-free solder. This is indicated by the "LF" symbol printed on the PWB and in the service manual. The suffix letter indicates the alloy type of the solder.

Example:



Indicates lead-free solder of tin, silver and copper

2. Using lead-free wire solder

When repairing a PWB with the "LF" symbol, only lead-free solder should be used. (Using normal tin/lead alloy solder may result in cold soldered joints and damage to printed patterns.)

As the melting point of lead-free solder is approximately 40°C higher than tin/lead alloy solder, it is recommend that a dedicated bit is used, and that the iron temperature is adjusted accordingly.

3. Soldering

As the melting point of lead-free solder (Sn-Ag-Cu) is higher and has poorer wettability, (flow), to prevent damage to the land of the PWB, extreme care should be taken not to leave the bit in contact with the PWB for an extended period of time. Remove the bit as soon as a good flow is achieved. The high content of tin in lead free solder will cause premature corrosion of the bit. To reduce wear on the bit, reduce the temperature or turn off the iron when it is not required.

Leaving different types of solder on the bit will cause contamination of the different alloys, which will alter their characteristics, making good soldering more difficult. It will be necessary to clean and replace bits more often when using lead-free solder. To reduce bit wear, care should be taken to clean the bit thoroughly after each use.

CHAPTER 11. COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

[1] BEFORE OPERATING

WARNING AGAINST HIGH VOLTAGE:

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with following parts may result in severe, possibly fatal, electric shock.

(Example)

High Voltage Capacitor, High Voltage Transformer, Magnetron, High Voltage Rectifier Assembly, High Voltage fuse, High Voltage Harness etc..

WARNING: Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.

- | | |
|--|---|
| <ol style="list-style-type: none"> 1) Disconnect the power supply cord. 2) Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.). <p>Carry out any remedial work that is necessary before operating the oven.</p> <p>Do not operate the oven if any of the following conditions exist;</p> <ol style="list-style-type: none"> 1) Door does not close firmly. 2) Door hinge, support or latch hook is damaged. 3) The door gasket or seal is damaged. 4) The door is bent or warped. | <ol style="list-style-type: none"> 5) There are defective parts in the door interlock system. 6) There are defective parts in the microwave generating and transmission assembly. 7) There is visible damage to the oven. <p>Do not operate the oven:</p> <ol style="list-style-type: none"> 1) Without the RF gasket (Magnetron). 2) If the wave guide or oven cavity are not intact. 3) If the door is not closed. 4) If the outer case (cabinet) is not fitted. |
|--|---|

WARNING FOR WIRING

To prevent an electric shock, take the following manners.

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Before wiring, <ol style="list-style-type: none"> 1) Disconnect the power supply cord. 2) Open the door and block it open. 3) Discharge the high voltage capacitor and wait for 60 seconds. 2. Don't let the wire leads touch to the following parts; <ol style="list-style-type: none"> 1) High voltage parts:
Magnetron, High voltage transformer, High voltage capacitor, High voltage rectifier assembly and High voltage fuse. 2) Hot parts:
Oven lamp, Magnetron, High voltage transformer and Oven cavity. | <ol style="list-style-type: none"> 3) Sharp edge:
Bottom plate, Oven cavity, Waveguide flange and other metallic plate. 4) Movable parts (to prevent a fault)
Fan blade, Fan motor, Turntable motor and Switch. 3. Do not catch the wire leads in the outer case cabinet. 4. Insert the positive lock connector certainly until its pin is locked and make sure that the wire leads do not come off even if the wire leads are pulled. 5. To prevent an error function, connect the wire leads correctly, referring to the Pictorial Diagram. |
|--|--|

Please refer to 'OVEN PARTS, CABINET PARTS, CONTROL PANEL PARTS, DOOR PARTS', when carrying out any of the following removal procedures:

REMEMBER TO CHECK 3D

- | | |
|---|--|
| <ol style="list-style-type: none"> 1) Disconnect the supply. 2) Door opened, and wedged open. | <ol style="list-style-type: none"> 3) Discharge high voltage capacitor. |
|---|--|

[2] OUTER CASE REMOVAL

To remove the outer case, procedure as follows.

- | | |
|--|--|
| <ol style="list-style-type: none"> 1. Disconnect the oven from power supply. 2. Open the oven door and wedge it open. 3. Remove the two (2) screws from right side of the outer case cabinet. 4. Remove the five (5) screws from rear and along the side edge of case. | <ol style="list-style-type: none"> 5. Slide the entire case back about 3cm to free it from retaining clips on the cavity face plate. 6. Lift the entire case from the oven. 7. Discharge the H.V. capacitor before carrying out any further work. 8. Do not operate the oven with the outer case removed. <p>NOTE: Step 1, 2 and 7 form the basis of the <u>3D</u> checks.</p> <p>CAUTION: DISCONNECT OVEN FROM POWER SUPPLY BEFORE REMOVING OUTER CASE.</p> |
|--|--|

[3] HIGH VOLTAGE TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS.

2. Disconnect the wire leads (main wire harness and H.V. fuse) from high voltage transformer.
3. Disconnect the filament lead of high voltage transformer from the magnetron.
4. Disconnect the filament lead of the high voltage transformer from high voltage capacitor.

[4] HIGH VOLTAGE RECTIFIER ASSEMBLY, HIGH VOLTAGE FUSE AND HIGH VOLTAGE CAPACITOR REMOVAL

To remove the components, proceed as follows.

1. CARRY OUT 3D CHECKS.
2. Disconnect the H.V. fuse from the high voltage transformer.
3. Disconnect the H.V. wire of the H.V. rectifier assembly from the magnetron.
4. Disconnect the filament lead of the high voltage transformer from the H.V. capacitor.
5. Remove one (1) screw holding capacitor holder to the oven cavity back plate.
6. Remove one (1) screw holding earth side terminal of high voltage rectifier assembly, and remove capacitor holder.

5. Remove the two (2) screws holding the transformer to bottom plate from below.
6. Remove the two (2) screws holding the transformer to bottom plate from above.
7. Remove the transformer.

7. Disconnect all the leads and terminals of high voltage rectifier assembly from high voltage capacitor.
8. Disconnect the H.V. fuse from the high voltage capacitor.
9. Now H.V. rectifier assembly, H.V. fuse and H.V. capacitor should be free.

CAUTION: WHEN REPLACING HIGH VOLTAGE RECTIFIER ASSEMBLY, ENSURE THAT THE CATHODE (EARTH) CONNECTION IS SECURELY FIXED TO THE CAPACITOR HOLDER WITH AN EARTHING SCREW.

CAUTION: DO NOT REPLACE ONLY HIGH VOLTAGE RECTIFIER. WHEN REPLACING IT, REPLACE HIGH VOLTAGE RECTIFIER ASSEMBLY.

[5] MAGNETRON REMOVAL

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the magnetron.
3. Remove the two (2) screws holding the air duct to the oven cavity.
4. Release the air duct from the oven cavity.
5. Carefully remove the four (4) screws holding the magnetron to the waveguide flange.
6. Lift up magnetron with care so that the magnetron antenna is not hit by any metal object around antenna.
7. Now, the magnetron is free.

2. REINSTALLATION

1. Reinstall the magnetron to the waveguide flange with the four (4) screws.
2. Reinstall the air duct to the oven cavity with the two (2) screws.
3. Reconnect the wire leads to the magnetron. Refer to "PICTORIAL DIAGRAM".
4. Reinstall the outer case and check that the oven is operating properly.

CAUTION: WHEN REPLACING THE MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND THE MAGNETRON MOUNTING SCREWS ARE TIGHTENED SECURELY.

[6] POSITIVE LOCK CONNECTOR (NO-CASE TYPE) REMOVAL

1. CARRY OUT 3D CHECKS.
2. Push the lever of positive lock® connector.
3. Pull down on the positive lock® connector.

CAUTION: WHEN CONNECTING THE POSITIVE LOCK® CONNECTORS TO THE TERMINALS, CONNECT THE POSITIVE LOCK® SO THAT THE LEVER FACES YOU.

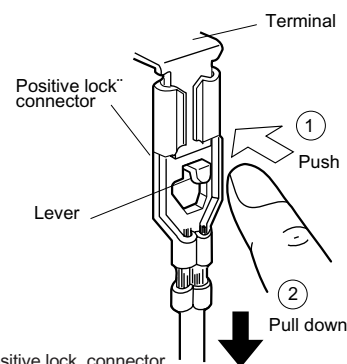


Figure C-1. Positive lock, connector

[7] TURNTABLE MOTOR REMOVAL

1. REMOVAL

1. Disconnect the power supply cord.
2. Remove turntable and turntable support from oven cavity.
3. Lay the oven on it's backside. Remove the turntable motor cover by snipping off the material in four corners.
4. Where the corners have been snipped off bend corner areas flat. No sharp edges must be evident after removal of the turntable motor cover.

5. Disconnect wire leads from turntable motor.
(See "Positive lock connector removal")
6. Remove one (1) screw holding turntable motor to oven cavity.
7. Remove the TTM packing from the turntable motor.
8. Now, the turntable motor is free.

2. REINSTALL

1. Re-install the TTM packing to the turntable motor.
2. Re-install the turntable motor with the TTM packing with the single (1) screw to the oven cavity bottom plate.
3. Re-connect the wire leads to the turntable motor.
4. Insert the tab of the turntable motor cover into the hole of the bottom plate.
5. Re-install the turntable motor cover to the bottom plate with one (1) screw.

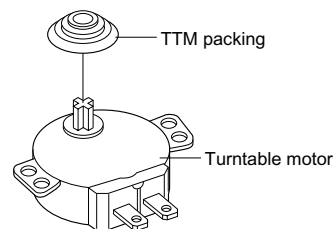


Figure C-2. TTM packing Installation

[8] COOLING FAN MOTOR REMOVAL

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the wire leads from the fan motor.
3. Remove the two (2) screws holding the fan motor to the oven cavity back plate.
4. Remove the fan blade from the fan motor shaft according to the following procedure.
5. Hold the edge of the rotor of the fan motor by using a pair of groove joint pliers.

CAUTION: MAKE SURE THAT ANY PIECES DO NOT ENTER THE GAP BETWEEN THE ROTOR AND THE STATOR OF THE FAN MOTOR. BECAUSE THE ROTOR IS EASY TO BE SHAVEN BY PLIERS AND METAL PIECES MAY BE PRODUCED.

DO NOT TOUCH THE PLIERS TO THE COIL OF THE FAN MOTOR BECAUSE THE COIL MAY BE CUT OR INJURED.

DO NOT DISFIGURE THE BRACKET BY TOUCHING WITH THE PLIERS.

6. Remove the fan blade from the shaft of the fan motor by pulling and rotating the fan blade with your hand.
7. Now, the fan blade will be free.

CAUTION: DO NOT RE-USE THE REMOVED FAN BLADE BECAUSE THE HOLE (FOR SHAFT) MAY BE LARGER THAN NORMAL.

8. Now, the fan motor is free.

2. INSTALLATION

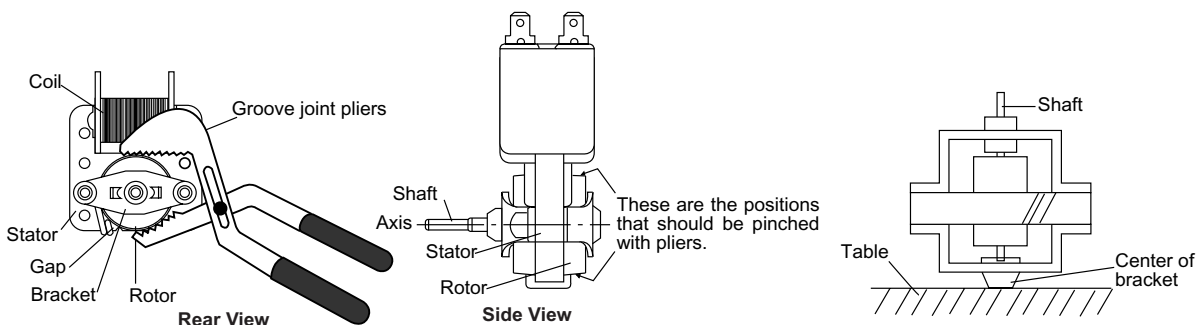
1. Install the fan blade to the fan motor shaft according to the following procedure.
2. Hold the center of the bracket which supports the shaft of the fan motor on the flat table.
3. Apply the screw lock tight into the hole (for shaft) of the fan blade.
4. Install the fan blade to the shaft of fan motor by pushing the fan blade with a small, light weight, ball peen hammer or rubber mallet.

CAUTION: DO NOT HIT THE FAN BLADE STRONGLY WHEN INSTALLED BECAUSE THE BRACKET MAY BE TRANSFORMED.

MAKE SURE THAT THE FAN BLADE ROTATES SMOOTH AFTER INSTALLED.

MAKE SURE THAT THE AXIS OF THE SHAFT IS NOT SLANTED.

5. Install the fan motor assembly to the oven cavity back plate with two (2) screws.
6. Connect the wire leads to the magnetron and fan motor, referring to the pictorial diagram.



[9] POWER SUPPLY CORD REPLACEMENT

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the single (1) screw holding the green/yellow wire to the oven cavity back plate.
3. Disconnect the leads of the power supply cord from the noise filter, referring to the Figure C-3(a).
4. Release the moulding cord stopper of the power supply cord from the square hole of the oven cavity back plate, referring to the Figure C-3 (b).
5. Now, the power supply cord is free.

2. REINSTALL

1. Insert the moulding cord stopper of power supply cord into the square hole of the rear cabinet, referring to the Figure C-3 (b).
2. Install the earth wire lead of power supply cord to the oven cavity back plate with one (1) screw and tight the screw.
3. Connect the brown and blue wire leads of power supply cord to the noise filter correctly, referring to the Pictorial Diagram.

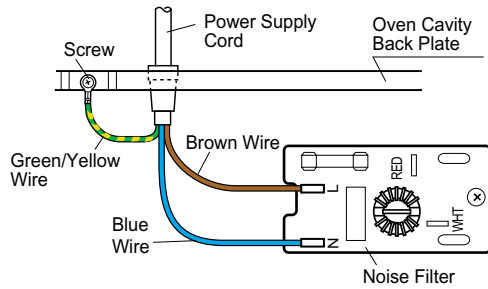


Figure C-3(a) Power Supply Cord Replacement

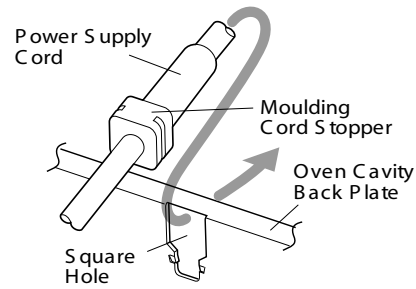


Figure C-3(a) Figure C-3(b) Power Supply Cord Replacement

[10] CONTROL PANEL ASSEMBLY REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the leads from the control unit.
3. Remove the one (1) screw holding the control panel to the front panel of the oven cavity.

4. Lift up the control panel assembly and release it from the oven cavity.
5. Now, the control panel assembly is free.

[11] 1ST. LATCH SWITCH, 2ND. INTERLOCK RELAY CONTROL SWITCH AND MONITOR SWITCH ADJUSTMENT

1. REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the control panel assembly, referring to section of CONTROL PANEL ASSEMBLY REMOVAL.
3. Disconnect wire leads from the switches.
4. Remove two (2) screws holding latch hook to oven flange.
5. Remove latch hook assembly from oven flange.
6. Push outward on the two (2) retaining tabs holding switch in place.
7. Switch is now free.

2. REINSTALL

1. Re-install each switch in its place. The 1st. latch switch and the monitor switch are in the lower position and the 2nd. interlock relay control switch is in the upper position
2. Secure latch hook (with two (2) mounting screws) to oven flange.
3. Re-connect wire leads to each switch. Refer to pictorial diagram.
4. Reinstall the control panel assembly to the oven cavity.
5. Reconnect wire leads to the control unit, referring to the pictorial diagram.
6. Make sure that the monitor switch is operating properly and check continuity of the monitor circuit. Refer to chapter "Test Procedure" and Adjustment procedure.

[12] 1ST. LATCH SWITCH, 2ND. INTERLOCK RELAY CONTROL SWITCH AND MONITOR SWITCH ADJUSTMENT

1. Adjustment

1. CARRY OUT 3D CHECKS.

If the 1st. latch switch, 2nd. interlock relay control switch and monitor switch do not operate properly due to a misadjustment, the following adjustment should be made.

2. Loosen the two (2) screws holding latch hook to the oven cavity front flange.
3. With door closed, adjust latch hook by moving it back and forth, and up and down. In and out play of the door allowed by the upper and lower position of the latch hook should be less than 0.5mm. The vertical position of the latch hook should be adjusted so that the 1st. latch switch and 2nd. interlock relay control switch are activated with the door closed. The horizontal position of the latch hook should be adjusted so that the plunger of the monitor switch is pressed with the door closed.
4. Secure the screws with washers firmly.
5. Check the operation of all switches. If each switch has not activated with the door closed, loosen screw and adjust the latch hook position.

2. After adjustment, check the following.

1. In and out play of door remains less than 0.5mm when in the latched position. First check upper position of latch hook, pushing and pulling upper portion of door toward the oven face.

Then check lower portion of the latch hook, pushing and pulling lower portion of the door toward the oven face. Both results (play in the door) should be less than 0.5mm.

2. When the door is open, the contacts of the 1st. latch switch and 2nd. interlock relay control switch open within 1.6mm gap between right side of cavity face and the door.
3. Monitor switch contacts close when door is opened.
4. Re-install outer case and check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

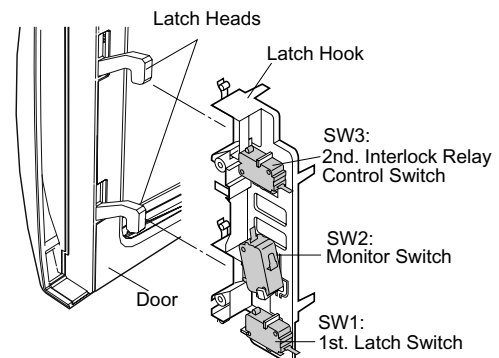


Figure C-5. Latch Switch Adjustments

[13] DOOR REPLACEMENT

1. REMOVAL

1. Disconnect the power supply cord.
2. Open the door slightly.
3. Insert a putty knife (thickness of about 0.5mm) into the gap between the choke cover and corner portion of door panel as shown in Figure C-6 to free engaging parts.
4. Pry the choke cover by inserting a putty knife as shown Figure C-6.
5. Release choke cover from door panel.
6. Now choke cover is free.

NOTE: When carrying out any repair to the door, do not bend or warp the slit choke (tabs on the door panel assembly) to prevent microwave leakage.

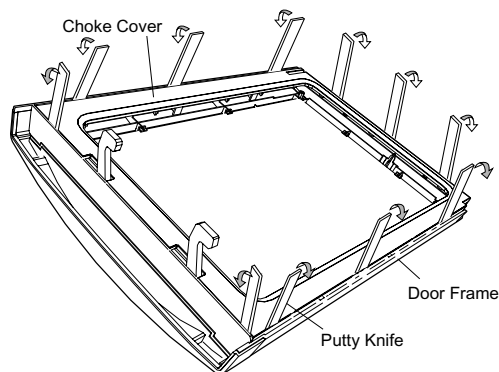


Figure C-6. Door Disassembly

7. Release two (2) pins of door panel from two (2) holes of upper and lower oven hinges by lifting up.
8. Now, door panel with door frame is free from oven cavity.
9. Release door panel from ten (10) tabs of door frame and remove the door frame by sliding the door panel downward.
10. Now, door panel with sealer film is free.
11. Tear sealer film from door panel.
12. Now, door panel is free.
13. Slide latch head upward and remove it from door frame with releasing latch spring from door frame and latch head.
14. Now, latch head and latch spring are free.
15. Remove the two (2) screws holding the door handle and the glass stopper to the door frame.
16. Remove the door handle and the glass stopper from the door frame.
17. Remove the door glass from the door frame by sliding the door glass rightwards.
18. Now, door glass is free.

2. REINSTALLATION

1. Insert door glass into the door frame by sliding leftwards.
2. Re-install the glass stopper and the door handle to the door frame with the two (2) screws.
3. Re-install latch spring to the head. Re-install latch spring to the door frame. Re-install latch head to the door frame.
4. Re-install door panel to door frame by fitting ten (10) tabs of door frame to ten (10) holes of door panel.
5. Put sealer film on door panel. Refer to "Sealer Film" about how to handle new one.
6. Catch two (2) pins of door panel on two (2) hole of upper and lower oven hinges

7. Re-install choke cover to door panel by pushing.

NOTE: After any service to the door;

- 1) **Make sure that 1st. latch switch, 2nd. interlock relay control switch and monitor switch are operating properly. (Refer to chapter "Test Procedures").**
- 2) **An approved microwave survey meter should be used to assure compliance with proper microwave radiation emission limitation standards.**

3. After any service, make sure of the following:

1. Door latch heads smoothly catch latch hook through latch holes and that latch head goes through center of latch hole.
2. Deviation of door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. Door is positioned with its face pressed toward cavity face plate.
4. Check for microwave leakage around door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure).

NOTE: The door on a microwave oven is designed to act as an electronic seal preventing the leakage of microwave energy from oven cavity during cook cycle. This function does not require that door be air-tight, moisture (condensation)-tight or light-tight. Therefore, occasional appearance of moisture, light or sensing of gentle warm air movement around oven door is not abnormal and do not of themselves, indicate a leakage of microwave energy from oven cavity.

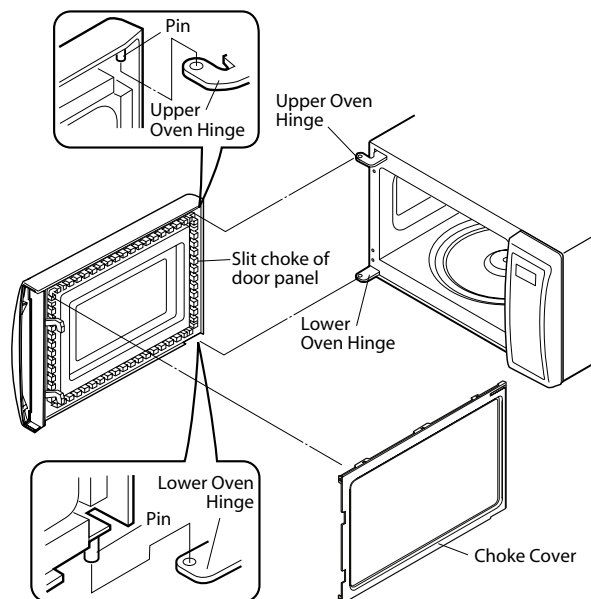


Figure C-7. Door Replacement

4. SEALER FILM

1. Put the adhesive tape on the backing film of the sealer film as shown in Fig. C-8
2. Tear the backing film by pulling the adhesive tape.
3. Put the pasted side of the sealer film on the door panel

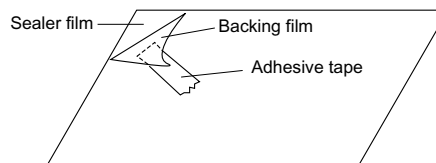


Figure C-8. Sealer film

CHAPTER 12. MICROWAVE MEASUREMENT

After adjustment of door latch switches, monitor switch and door are completed individually or collectively, the following leakage test must be performed with a survey instrument and it must be confirmed that the result meets the requirements of the performance standard for microwave oven.

REQUIREMENT

The safety switch must prevent microwave radiation emission in excess of $5\text{mW}/\text{cm}^2$ at any point 5cm or more from external surface of the oven.

PREPARATION FOR TESTING

Before beginning the actual test for leakage, proceed as follows;

1. Make sure that the test instrument is operating normally as specified in its instruction booklet.

Important:

Survey instruments that comply with the requirement for instrumentations as prescribed by the performance standard for microwave ovens must be used for testing.

Recommended instruments are:

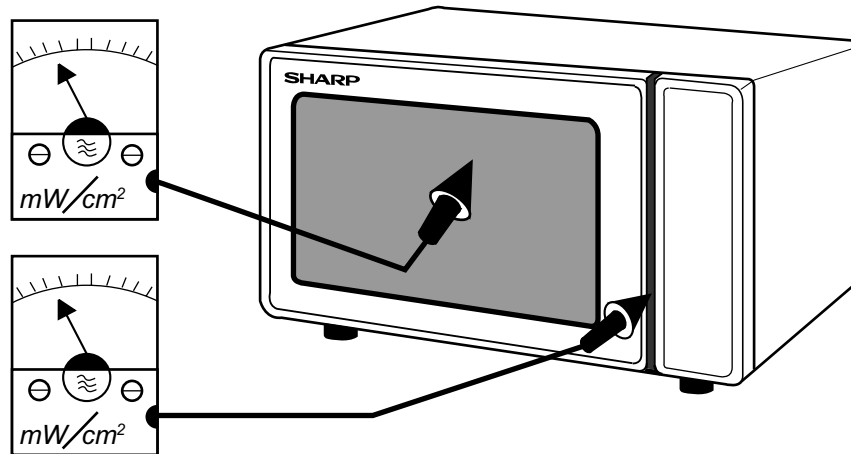
NARDA 8100

NARDA 8200

HOLADAY HI 1500

SIMPSON 380M

2. Place the oven tray into the oven cavity.
3. Place the load of $275 \pm 15\text{ml}$ of water initially at $20 \pm 5^\circ\text{C}$ in the centre of the oven tray. The water container should be a low form of 600 ml beaker with inside diameter of approx. 8.5cm and made of an electrically non-conductive material such as glass or plastic.
The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
4. Close the door and turn the oven ON with the timer set for several minutes. If the water begins to boil before the survey is completed, replace it with 275ml of cool water.
5. Move the probe slowly (not faster than $2.5\text{cm}/\text{sec.}$) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.



Microwave leakage measurement at 5 cm distance

CHAPTER 13. TEST DATA AT A GLANCE

PARTS	SYMBOL	VALUE / DATA
Fuse	F1	T6.3A 250V
High voltage fuse	F2	0.6A 5kV
Temperature fuse	TF	150°C
Oven lamp	OL	240V 25W
High voltage capacitor	C	0.91 μ F AC 2100V
Magnetron	MG	Filament < 1 Ω / Filament - chassis ∞ ohm
High voltage transformer	T	Filament winding < 1 Ω Secondary winding Approx. 208 Ω Primary winding Approx. 2.7 Ω

WARNING: DISCONNECT THE PLUG WHEN MEASURING RESISTANCE
--

CHAPTER 14. CIRCUIT DIAGRAMS

[1] Oven Schematic

SCHEMATIC

NOTE: CONDITION OF OVEN
1. DOOR CLOSED.

NOTE: "★" indicates components with potentials above 250V

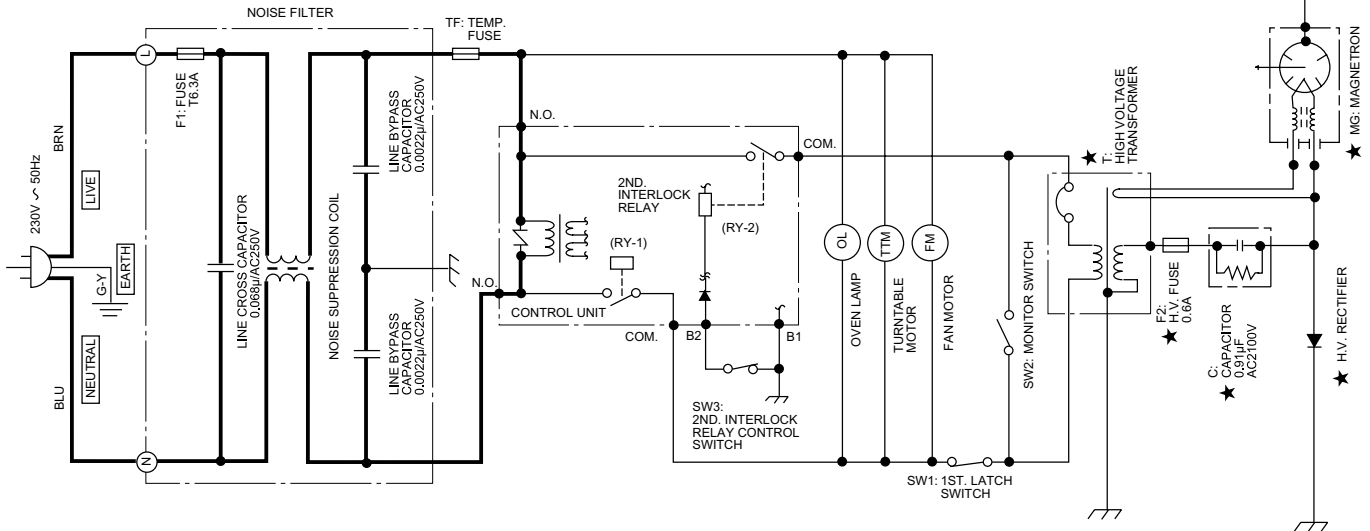


Figure O-1 Oven Schematic-OFF Condition

SCHEMATIC

NOTE: CONDITION OF OVEN
1. DOOR CLOSED.
2. COOKING TIME PROGRAMMED.

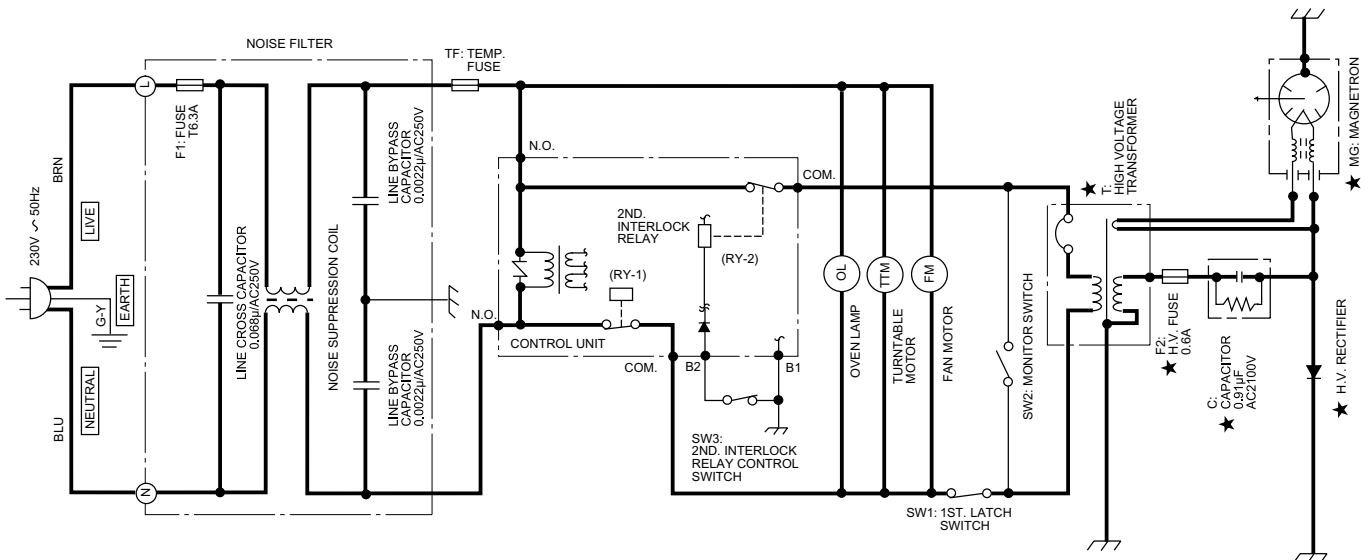


Figure O-2 Oven Schematic-ON Condition



[3] Control Unit Circuit (Figure S-2)

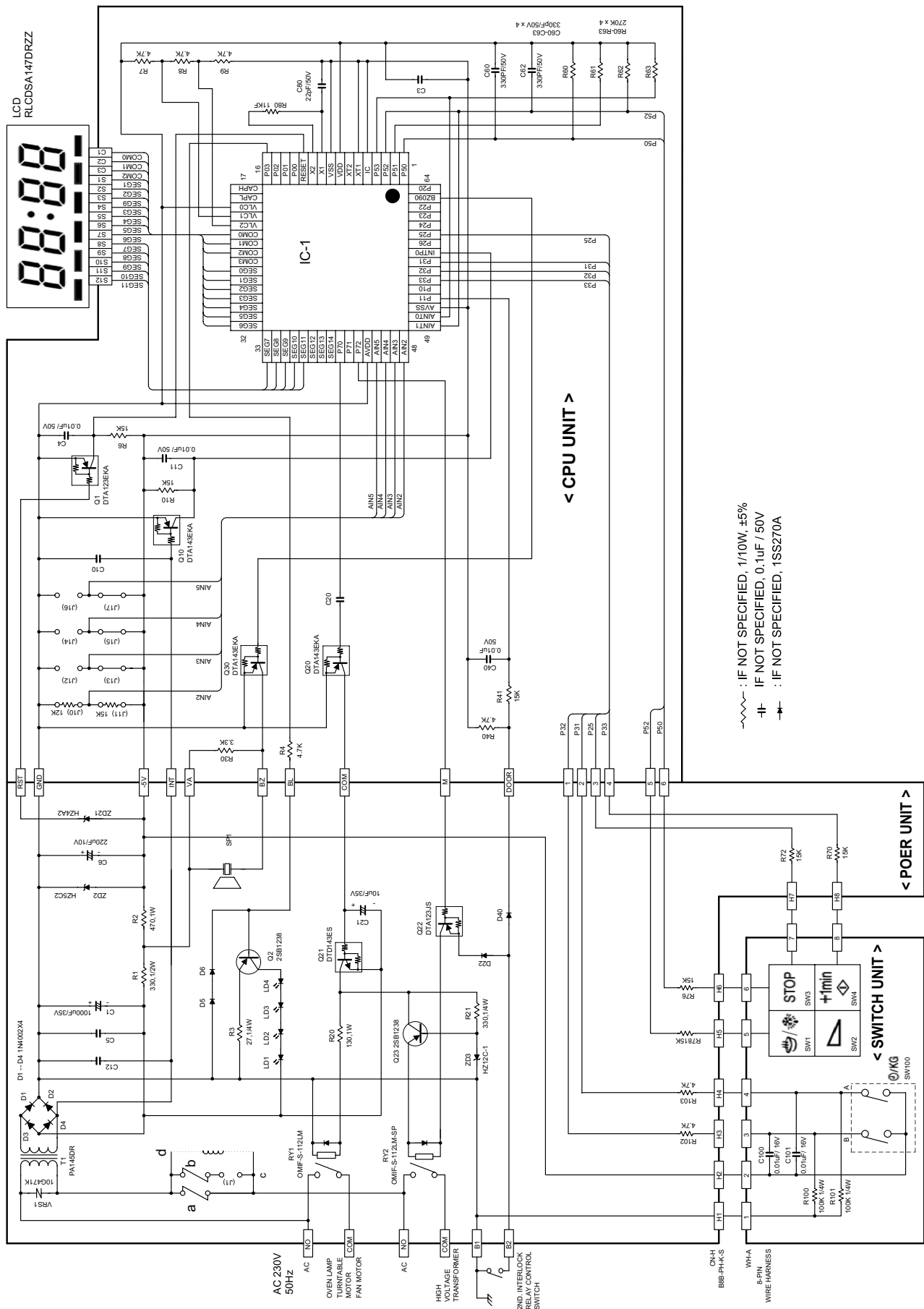


Figure S-2. Control Unit Circuit

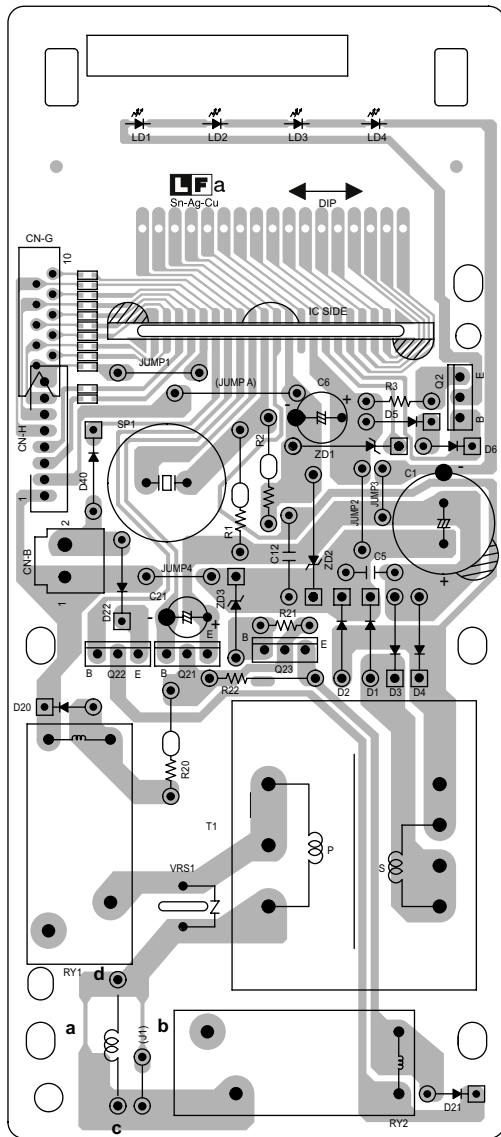
[4] Printed Wiring Board

Figure S-3. Printed Wiring Board of Power Unit

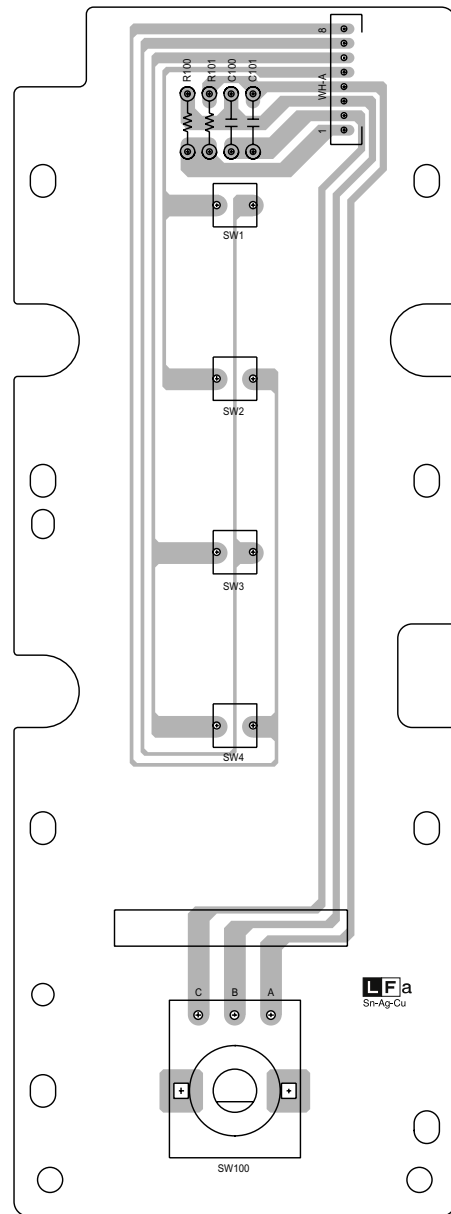


Figure S-4. Printed Wiring Board of Switch Unit

SHARP PARTS LIST

MICROWAVE OVEN

HOW TO ORDER REPLACEMENT PARTS
To have your order filled promptly and correctly, please furnish the following information.

1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

MODELS R-239(IN) R-239(W)

Parts marked "*" may cause undue microwave exposure.
Parts marked "▲" are used in voltage more than 250V.

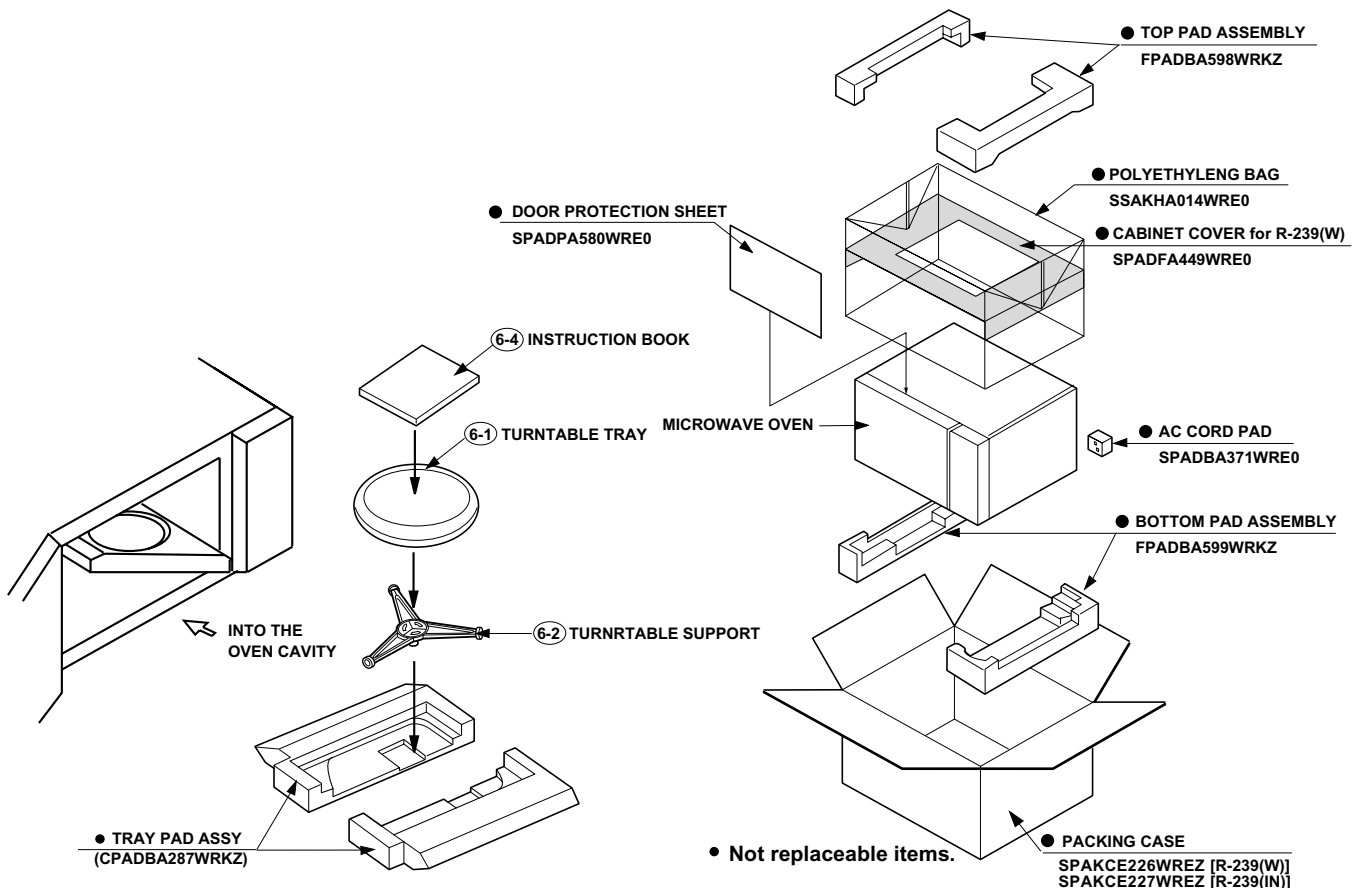
CONTENTS

[1] OVEN PARTS

PANEL PARTS

[2] DOOR AND CONTROL

■ INDEX

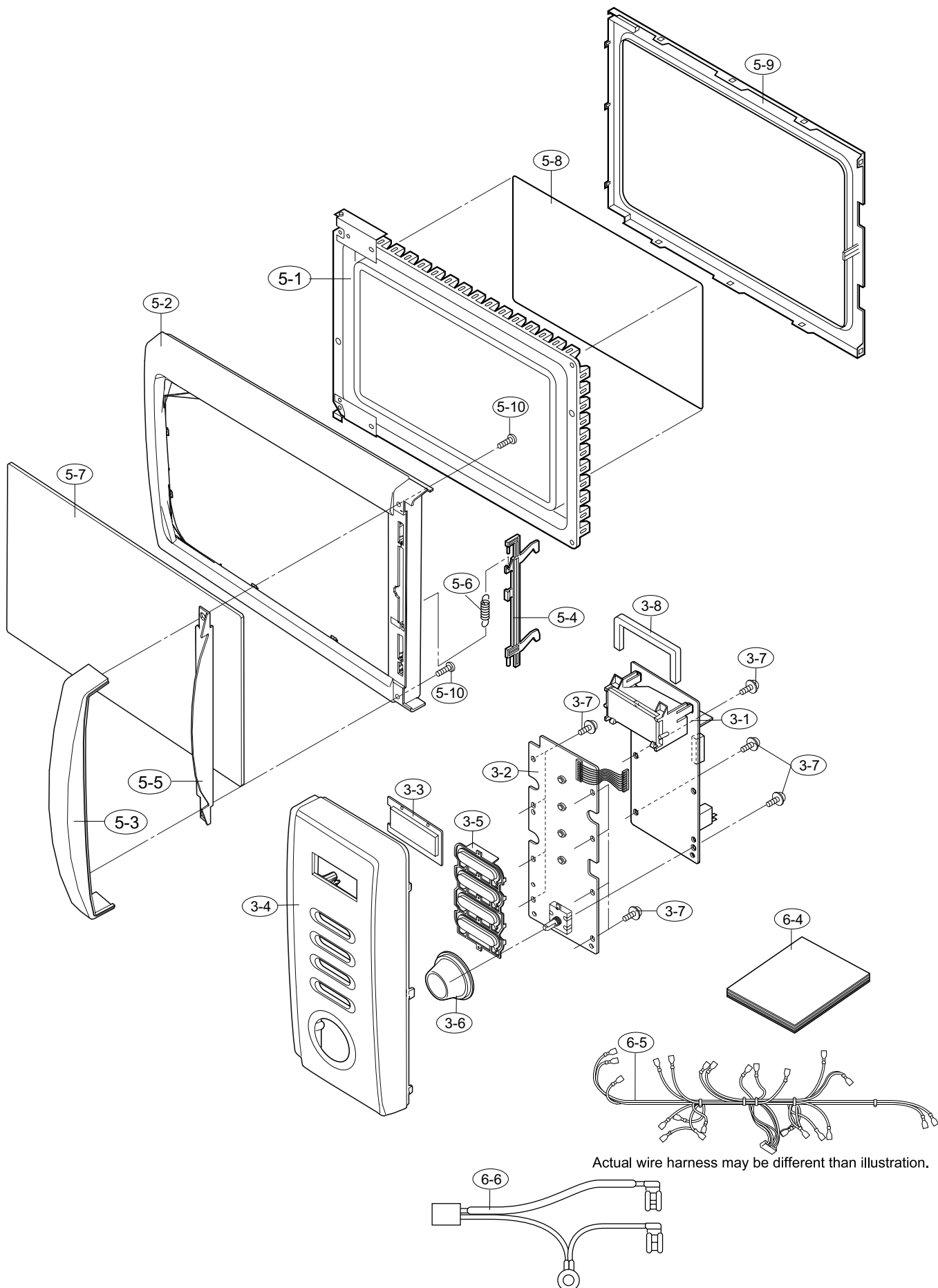


SHARP CORPORATION

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NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[1] OVEN PARTS					
ELECTRIC PARTS					
1-1	QACC-A075WRE0	AW			Power supply cord
1-2	FH-DZA115WRKZ	AR			High voltage rectifier assy
1-3	FPWBFA387WRKZ	AW			Noise filter
C	RC-QZA295WRZZ	AV			High voltage capacitor
C	RC-QZA218WRE0	AW			High voltage capacitor (Interchangeable)
F1	QFS-CA027WRZZ	AG			Fuse T6.3A
F2	QFS-IA004WRE0	AK			High voltage fuse 0.6A
FM	RMOTEA405WRZZ	AX			Fan motor
FM	RMOTEA390WRE0	AW			Fan motor (Interchangeable)
MG	RV-MZA341WRZZ	BG			Magnetron
OL	RLMPTA083WRZZ	AM			Oven lamp
SW1	QSW-MA085WRE0	AF			1st. Latch switch
SW1	QSW-MA137WRE0	AH			1st. Latch switch (Interchangeable)
SW1	QSW-MA147WRZZ	AG			1st. Latch switch (Interchangeable)
SW2	QSW-MA086WRE0	AF			Monitor switch
SW2	QSW-MA138WRE0	AH			Monitor switch (Interchangeable)
SW2	QSW-MA148WRZZ	AF			Monitor switch (Interchangeable)
SW3	QSW-MA085WRE0	AF			2nd. Interlock relay control switch
SW3	QSW-MA137WRE0	AH			2nd. Interlock relay control switch (Interchangeable)
SW3	QSW-MA147WRZZ	AG			2nd. Interlock relay control switch (Interchangeable)
T	RTRN-A734WRZZ	BM			High voltage transformer
TF	QFS-TA014WRE0	AG			Temperature fuse 150C (Oven)
TTM	RMOTDA265WRZZ	AS			Turntable motor
TTM	RMOTDA173WRE0	AX			Turntable motor (Interchangeable)
TTM	RMOTDA253WRZZ	AV			Turntable motor (Interchangeable)
CABINET PARTS					
2-1	GCABUA958WRPZ	BE			Outer case cabinet [R-239(W)]
2-1	GCABUA966WRPZ	BE			Outer case cabinet [R-239(IN)]
2-2	GDAI-A377WRWZ	AS			Bottom plate
2-3	GLEGPA104WREZ	AF			Foot
OVENPARTS					
4-1	PHOK-A146WRFZ				Latch hook
4-2	LBNDKA168WRPZ	AD			Capacitor holder
4-3	NFANJA053WRFZ	AG			Fan blade
4-4	PDUC-A908WRWZ	AR			Fan duct
4-5	FOVN-A551WRTZ	BG			Oven cavity
4-6	LANGFA267WRPZ	AH			Chassis support
4-7	PSPAJA007WRFZ	AF			Spacer
4-8	PCOVPA419WREZ	AG			Waveguide cover
4-9	PDUC-A909WRPZ	AN			Air duct
4-10	PPACGA176WREZ	AC			TTM packing
4-11	PCUSUA501WRP0	AB			Cushion
4-12	PCUSGA664WREZ	AF			Cushion C
MISCELLANEOUS					
6-1	NTNT-A034WRF0	AM			Turntable
6-2	FROLPA101WRKZ	AR			Turntable support
6-3	TCAUHA168WRR0	AH			H caution label
SCREWS,NUTS AND WASHERS					
7-1	XHPS740P08K00	AB			Screw : 4mm x 8mm
7-2	XEPS740P10000	AA			Screw : 4mm x 10mm
7-3	XHPS740P08000	AB			Screw : 4mm x 8mm
7-4	LX-CZ0052WRE0	AA			Special screw
7-5	LX-EZA042WRE0	AB			Special screw
7-6	LX-CZA073WRE0	AC			Special screw
7-7	XHTS740P08RV0	AG			Screw : 4mm x 8mm
7-8	XOTS740P08000	AA			Screw : 4mm x 8mm
7-9	XOTS740P12RV0	AD			Screw : 4mm x 12mm
7-10	XOTS740P12000	AA			Screw : 4mm x 12mm

[2] DOOR AND CONTROL PANEL PARTS

NO.	PARTS CODE	PRICE RANK	NEW MARK	PART RANK	DESCRIPTION
[2] DOOR AND CONTROL PANEL PARTS					
3-1	DPWBFC487WRRZ	BH			Control unit
3-2	DPWBFC494WRKZ	BF			Switch unit
3-3	GMADIA144WRFZ	AG			Display window
3-4	HPNLCB933WRRZ	AT			Control panel [R-239(W)]
3-4	HPNLCB935WRRZ	AU			Control panel [R-239(IN)]
3-5	JBTN-B321WRRZ	AH			Select button [R-239(W)]
3-5	JBTN-B318WRRZ	AK			Select button [R-239(IN)]
3-6	JKNBKA729WRFZ	AG			Timer knob [R239(W)]
3-6	JKNBKA730WRTZ	AG			Timer knob [R239(IN)]
3-7	XEPS730P08XS0	AA			Screw; 3mm x 8mm
3-8	PCUSUA173WRP0	AC			Cushion
DOOR PARTS					
* 5-1	FDORFA397WRTZ	BB			Door panel assembly
* 5-2	GWAKPA995WRFZ	AW			Door frame [R-239(W)]
* 5-2	GWAKPA996WRTZ	AX			Door frame [R-239(IN)]
5-3	JHNDMA045WRTZ	AP			Door handle [R-239(W)]
5-3	JHNDMA047WRTZ	AP			Door handle[R-239(IN)]
* 5-4	LSTPPA211WRFZ	AG			Latch head
5-5	LSTPPA231WRFZ	AG			Glass stopper
5-6	MSPRTA187WRE0	AC			Spring
5-7	PGLSPA633WREZ	AR			Door glass
5-8	PSHEPA782WREZ	AG			Sealer film
* 5-9	GCOVHA424WRFZ	AK			Choke cover
5-10	XEPS740P10000	AA			Screw : 4mm x 10mm
MISCELLANEOUS					
6-4	TINSZA133WRRZ	AP			Instruction book
6-5	FW-VZC056WREZ	AQ			Main wire harness
6-6	FW-VZB888WREZ	AU			Switch harness

■INDEX

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
[D]				
DPWBFC487WRUZ	2-3-1	BH		
DPWBFC494WRKZ	2-3-2	BF		
[F]				
FDORFA397WRTZ	2-5-1	BB		
FH-DZA115WRKZ	1-1-2	AR		
FOVN-A551WRTZ	1-4-5	BG		
FPWBFA387WRKZ	1-1-3	AW		
FROLPA101WRKZ	1-6-2	AR		
FW-VZB888WREZ	2-6-6	AU		
FW-VZC056WREZ	2-6-5	AQ		
[G]				
GCABUA958WRPZ	1-2-1	BE		
GCABUA966WRPZ	1-2-1	BE		
GCOVHA424WRFZ	2-5-9	AK		
GDAI-A377WRWZ	1-2-2	AS		
GLEGPA104WREZ	1-2-3	AF		
GMADIA144WRFZ	2-3-3	AG		
GWAKPA995WRFZ	2-5-2	AW		
GWAKPA996WRTZ	2-5-2	AX		
[H]				
HPNLCB933WRRZ	2-3-4	AT		
HPNLCB935WRRZ	2-3-4	AU		
[J]				
JBTN-B318WRRZ	2-3-5	AK		
JBTN-B321WRRZ	2-3-5	AH		
JHNDMA045WRTZ	2-5-3	AP		
JHNDMA047WRTZ	2-5-3	AP		
JKNBKA729WRFZ	2-3-6	AG		
JKNBKA730WRTZ	2-3-6	AG		
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LBNDKA168WRPZ	1-4-2	AD		
LSTPPA211WRFZ	2-5-4	AG		
LSTPPA231WRFZ	2-5-5	AG		
LX-CZ0052WRE0	1-7-4	AA		
LX-CZA073WRE0	1-7-6	AC		
LX-EZA042WRE0	1-7-5	AB		
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MSPRTA187WRE0	2-5-6	AC		
[N]				
NFANJA053WRFZ	1-4-3	AG		
NTNT-A034WRF0	1-6-1	AM		
[P]				
PCOVPA419WREZ	1-4-8	AG		
PCUSGA664WREZ	1-4-12	AF		
PCUSUA173WRP0	2-3-8	AC		

PARTS CODE	No.	PRICE RANK	NEW MARK	PART RANK
PCUSUA501WRP0	1-4-11	AB		
PDUC-A908WRWZ	1-4-4	AR		
PDUC-A909WRPZ	1-4-9	AN		
PGLSPA633WREZ	2-5-7	AR		
PHOK-A146WRFZ	1-4-1			
PPACGA176WREZ	1-4-10	AC		
PSHEPA782WREZ	2-5-8	AG		
PSPAJA007WRFZ	1-4-7	AF		
[Q]				
QACC-A075WRE0	1-1-1	AW		
QFS-CA027WRZZ	1-F1	AG		
QFS-IA004WRE0	1-F2	AK		
QFS-TA014WRE0	1-TF	AG		
QSW-MA085WRE0	1-SW1	AF		
"	1-SW3	AF		
QSW-MA086WRE0	1-SW2	AF		
QSW-MA137WRE0	1-SW1	AH		
"	1-SW3	AH		
QSW-MA138WRE0	1-SW2	AH		
QSW-MA147WRZZ	1-SW1	AG		
"	1-SW3	AG		
QSW-MA148WRZZ	1-SW2	AF		
[R]				
RC-QZA218WRE0	1-C	AW		
RC-QZA295WRZZ	1-C	AV		
RLMPTA083WRZZ	1-OL	AM		
RMOTDA173WRE0	1-TTM	AX		
RMOTDA253WRZZ	1-TTM	AV		
RMOTDA265WRZZ	1-TTM	AS		
RMOTEA390WRE0	1-FM	AW		
RMOTEA405WRZZ	1-FM	AX		
RTRN-A734WRZZ	1-T	BM		
RV-MZA341WRZZ	1-MG	BG		
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TCAUHA168WRR0	1-6-3	AH		
TINSZA133WRRZ	2-6-4	AP		
[X]				
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XEPS740P10000	1-7-2	AA		
"	2-5-10	AA		
XHPS740P08000	1-7-3	AB		
XHPS740P08K00	1-7-1	AB		
XHTS740P08RV0	1-7-7	AG		
XOTS740P08000	1-7-8	AA		
XOTS740P12000	1-7-10	AA		
XOTS740P12RV0	1-7-9	AD		

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